

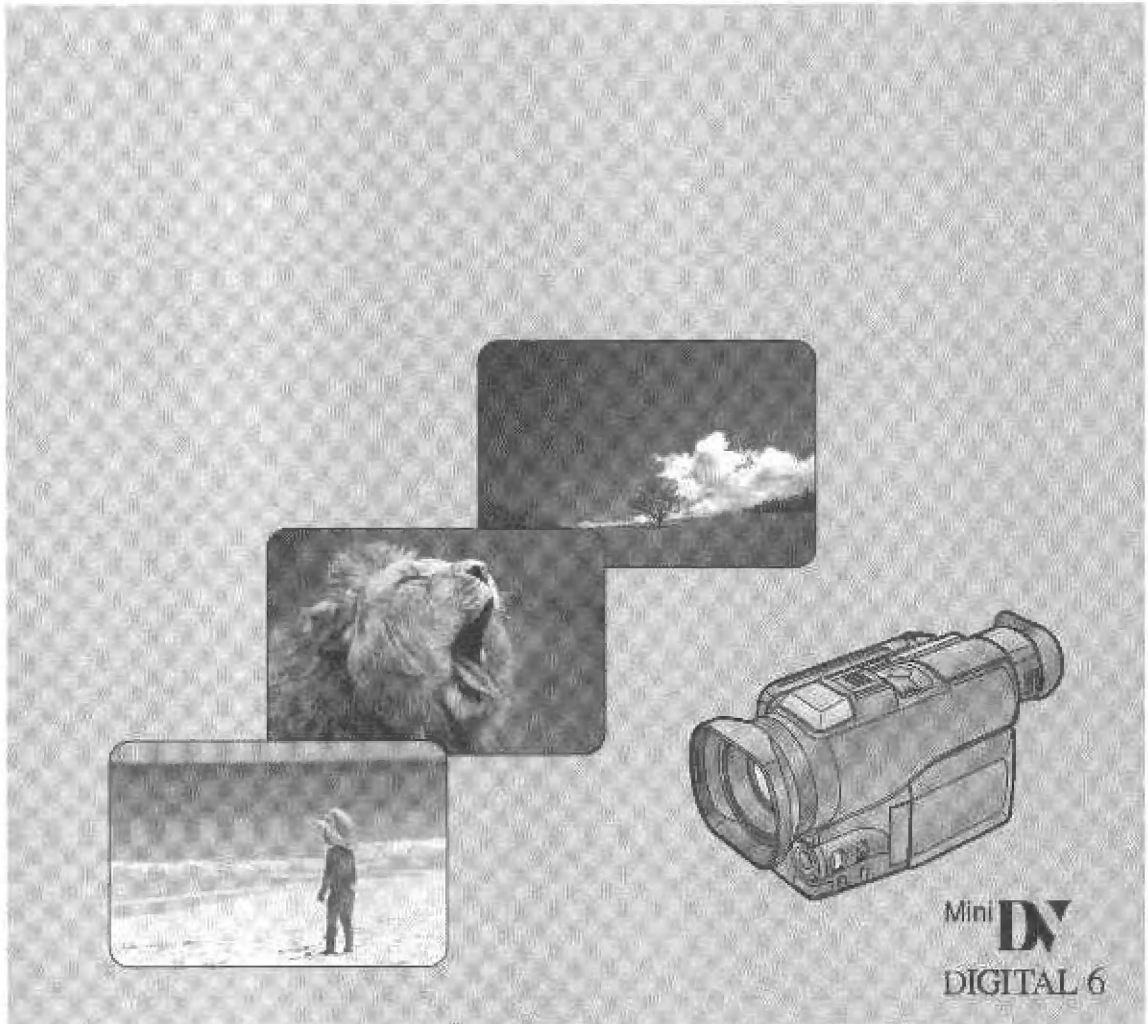
Panasonic

Digital Video Camera

Operating Instructions

PV-DV950

Model No. **PV-DV950**



Before use, please read these instructions completely.

LSQT0180

Things You Should Know

Thank you for choosing Panasonic!

You have purchased one of the most sophisticated and reliable products on the market today. Used properly, we're sure it will bring you and your family years of enjoyment. Please take time to fill in the information at right. The serial number is on the tag located on the underside of your Palmcorder. Be sure to retain this manual as your convenient Palmcorder information source.

Date of Purchase _____

Dealer Purchased From _____

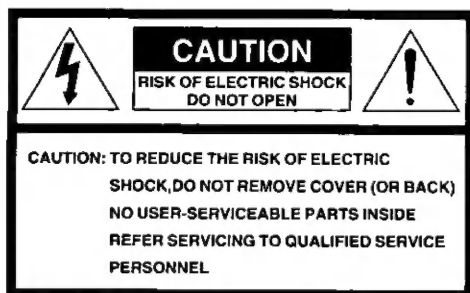
Dealer Address _____

Dealer Phone No. _____

Model No. _____

Serial No. _____

Safety Precautions



This symbol warns the user that uninsulated voltage within the unit may have sufficient magnitude to cause electric shock. Therefore, it is dangerous to make any kind of contact with any inside part of this unit.



This symbol alerts the user that important literature concerning the operation and maintenance of this unit has been included. Therefore, it should be read carefully in order to avoid any problems.

WARNING:
TO PREVENT FIRE OR SHOCK HAZARD,
DO NOT EXPOSE THIS EQUIPMENT TO
RAIN OR MOISTURE.

CAUTION:
TO PREVENT FIRE OR SHOCK HAZARD
AND ANNOYING INTERFERENCE, USE
THE RECOMMENDED ACCESSORIES
ONLY.

FCC Warning: Any unauthorized changes or modifications to this equipment would void the user's authority to operate.

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Note: This equipment has been tested and found to comply with Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when operated in a residential environment.

If this equipment does cause interference to radio or television reception, which can be determined by turning the equipment off and on, use the equipment in another location and/or utilize an electrical outlet different from that used by the receiver.


If necessary, consult the dealer or an experienced radio/TV technician for help. You may find the booklet, 'Something About Interference' available from FCC local regional offices helpful.

The above markings are located on the appliance bottom cover.

Your "IX" Palmcorder is designed to record and play back in Standard Play (SP) mode only.

This Palmcorder is equipped with the HQ System to provide excellent video pictures. It is recommended that only cassette tapes that have been tested and inspected for use in VCR machines with the "IX" mark be used.

Important Safeguards

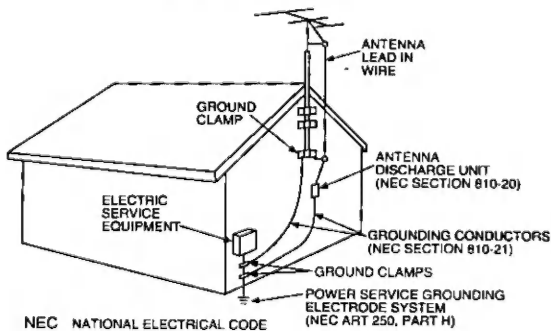
1. **Read Instructions** — All the safety and operating instructions should be read before the unit is operated.
2. **Retain Instructions** — The safety and operating instructions should be retained for future reference.
3. **Heed Warnings** — All warnings on the unit and in the operating instructions should be adhered to.
4. **Follow Instructions** — All operating and maintenance instructions should be followed.
5. **Cleaning** — Unplug this video unit from the wall outlet before cleaning. Do not use liquid or aerosol cleaners. Use a dry cloth for cleaning.
6. **Attachments** — Do not use attachments not recommended by the video product manufacturer as they may be hazardous.
7. **Water and Moisture** — Do not use this video unit near water — for example near a bath tub, wash bowl, kitchen sink, or laundry tub, in a wet basement, or near a swimming pool, and the like.
8. **Accessories** — Do not place this video unit on an unstable cart, stand, tripod, bracket, or table. The video unit may fall, causing serious injury to a child or adult, and serious damage to the unit.


Use only with a cart, stand, tripod, bracket, or table recommended by the manufacturer, or sold with the video unit. Any mounting of the unit should follow the manufacturer's instructions and should use a mounting accessory recommended by the manufacturer. An appliance and cart combination should be moved with care. Quick stops, excessive force, and uneven surfaces may cause the appliance and cart combination to overturn.
9. **Ventilation** — Slots and openings in the cabinet are provided for ventilation and to ensure reliable operation of the video unit and to protect it from overheating. These openings must not be blocked or covered. Never place the video unit on a bed, sofa, rug, or other similar surface, or near or over a radiator or heat register. This video unit should not be placed in a built-in installation such as a bookcase or rack unless proper ventilation is provided or the manufacturer's instructions have been adhered to.
10. **Power Sources** — This video unit should be operated only from the type of power source indicated on the marking label. If you are not sure of the type of power supply to your home, consult your appliance dealer or local power company. For video units intended to be operated from battery power, or other sources, refer to the operating instructions.
11. **Grounding or Polarization** — This video unit may be equipped with either a polarized 2-wire AC (Alternating Current) line plug (a plug having one blade wider than the other) or 3-wire grounding type plug, a plug having a third (grounding) pin. The 2-wire polarized plug will fit into the power outlet only one way. This is a safety feature. If you are unable to insert the plug fully into the outlet, try reversing the plug. If the plug still fails to fit, contact your electrician to replace your obsolete outlet. Do not defeat the safety purpose of the polarized plug.
The 3-wire grounding type plug will fit into a grounding type power outlet. This is a safety feature. If you are unable to insert the plug into the outlet, contact your electrician to replace your obsolete outlet. Do not defeat the safety purpose of the grounding type plug.

Important Safeguards

12. **Power-Cord Protection** — Power-supply cords should be routed so that they are not likely to be walked on or pinched by items placed upon or against them, paying particular attention to cords of plugs, convenience receptacles, and the point where they exit from the unit.

13. **Outdoor Antenna Grounding** — If an outside antenna or cable system is connected to the video unit, be sure the antenna or cable system is grounded so as to provide some protection against voltage surges and built-up static charges. Part 1 of the Canadian Electrical Code, in USA Section 810 of the National Electrical Code, provides information with respect to proper grounding of the mast and supporting structure, grounding of the lead-in wire to an antenna discharge unit, size of grounding conductors, location of antenna discharge unit, connection to grounding electrodes, and requirements for the grounding electrode.



14. **Lightning** — For added protection of this video unit receiver during a lightning storm, or when it is left unattended and unused for long periods of time, unplug it from the wall outlet and disconnect the antenna or cable system. This will prevent damage to the video unit due to lightning and power-line surges.

15. **Power Lines** — An outside antenna system should not be located in the vicinity of overhead power lines or other electric light or power circuits, or where it can fall into such power lines or circuits. When installing an outside antenna system, extreme care should be taken to keep from touching such power lines or circuits as contact with them might be fatal.

16. **Overloading** — Do not overload wall outlets and extension cords as this can result in a risk of fire or electric shock.

17. **Objects and Liquids** — Never push objects of any kind into this video unit through openings as they may touch dangerous voltage points or short out parts that could result in a fire or electric shock. Never spill liquid of any kind onto the video unit.

18. **Servicing** — Do not attempt to service this video unit yourself as opening or removing covers may expose you to dangerous voltage or other hazards. Refer all servicing to qualified service personnel.

19. **Damage Requiring Service** — Unplug this video unit from the wall outlet and refer servicing to qualified service personnel under the following conditions:

- When the power-supply cord or plug is damaged.
- If any liquid has been spilled onto, or objects have fallen into the video unit.
- If the video unit has been exposed to rain or water.
- If the video unit does not operate normally by following the operating instructions. Adjust only those controls that are covered by the operating instructions, as an improper adjustment of other controls may result in damage and will often require extensive work by a qualified technician to restore the video unit to its normal operation.
- If the video unit has been dropped or the cabinet has been damaged.
- When the video unit exhibits a distinct change in performance — this indicates a need for service.

20. **Replacement Parts** — When replacement parts are required, be sure the service technician has used replacement parts specified by the manufacturer or have the same characteristics as the original part. Unauthorized substitutions may result in fire, electric shock or other hazards.

21. **Safety Check** — Upon completion of any service or repairs to this video unit, ask the service technician to perform safety checks to determine that the video unit is in safe operating order.

Important Safeguards

Precautions

USE & LOCATION

- **TO AVOID SHOCK HAZARD ...** Your Camcorder and power supply should not be exposed to rain or moisture. Do not connect the power supply or operate your Camcorder if it gets wet. Your Camcorder has been designed for outdoor use, however it is not designed to sustain direct exposure to water, rain, sleet, snow, sand, dust, or a direct splashing from a pool or even a cup of coffee. This action could permanently damage the internal parts of your Camcorder. Do not attempt to disassemble this unit. There are no user serviceable parts inside. Unplug your Camcorder from the power supply before cleaning.
- **DO NOT AIM YOUR CAMCORDER AT THE SUN OR OTHER BRIGHT OBJECTS**
- **DO NOT LEAVE THE CAMCORDER WITH THE EVF AIMED DIRECTLY AT THE SUN AS THIS MAY CAUSE DAMAGE TO THE INTERNAL PARTS OF THE EVF**
- **DO NOT EXPOSE YOUR CAMCORDER TO EXTENDED HIGH TEMPERATURE ...** Such as, in direct sunlight, inside a closed car, next to a heater, etc... This action could permanently damage the internal parts of your Camcorder.
- **AVOID SUDDEN CHANGES IN TEMPERATURE ...** If the unit is suddenly moved from a cold place to a warm place, moisture may form on the tape and inside the unit.
- **DO NOT LEAVE YOUR CAMCORDER OR THE POWER SUPPLY TURNED ON WHEN NOT IN USE.**
- **STORAGE OF YOUR CAMCORDER ...** Store and handle your Camcorder in a manner that will not subject it to unnecessary movement (avoid shaking and striking). Your Camcorder contains a sensitive pick-up device which could be damaged by improper handling or storage.

CARE

- **TO CLEAN YOUR CAMCORDER ...** Do not use strong or abrasive detergents when cleaning your Camcorder body.
- **TO PROTECT THE LENS ...** Do not touch the surface of the lens with your hand. Use a commercial camcorder lens solution and lens paper when cleaning the lens. Improper cleaning can scratch the lens coating.
- **TO PROTECT THE FINISH OF YOUR CAMCORDER ...** Before handling your Camcorder, make sure your hands and face are free from any chemical products, such as suntan lotion, as it may damage the finish.

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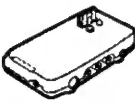


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1. PV-DAC7 	2. PV-DBP5 	3. VSQW0044 
4. VSQS1511 	5. VFC2494 	6. LSYF0388 

Standard Accessories

1. AC Adaptor (→ 11, 12)

To supply power to the Movie Camera.

To charge the Battery.

DC Input Cable and AC Power Cord

(→ 11, 12)

To connect the AC Adaptor to the Movie Camera and to an AC Outlet.

2. Lithium Ion Battery Pack (→ 12)

To supply the Movie Camera with power.

3. Remote Controller and Button-Type Battery

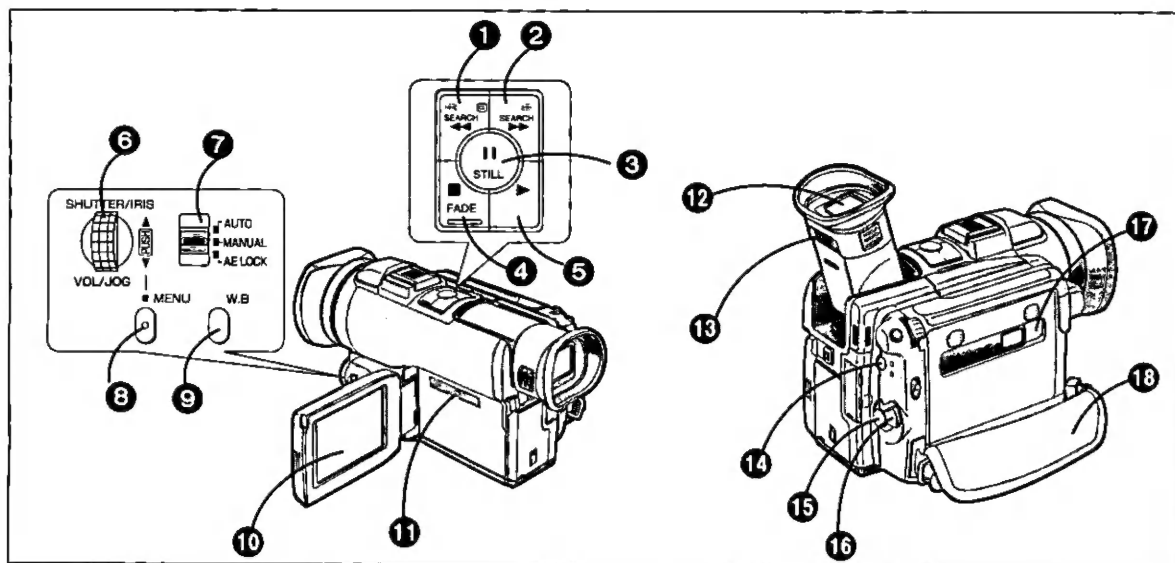
(→ 50, 51, 52, 53)

4. Docking Station (→ 29, 30, 55)

Equipped with AV Jacks, Edit Jack and Headphones Jack.

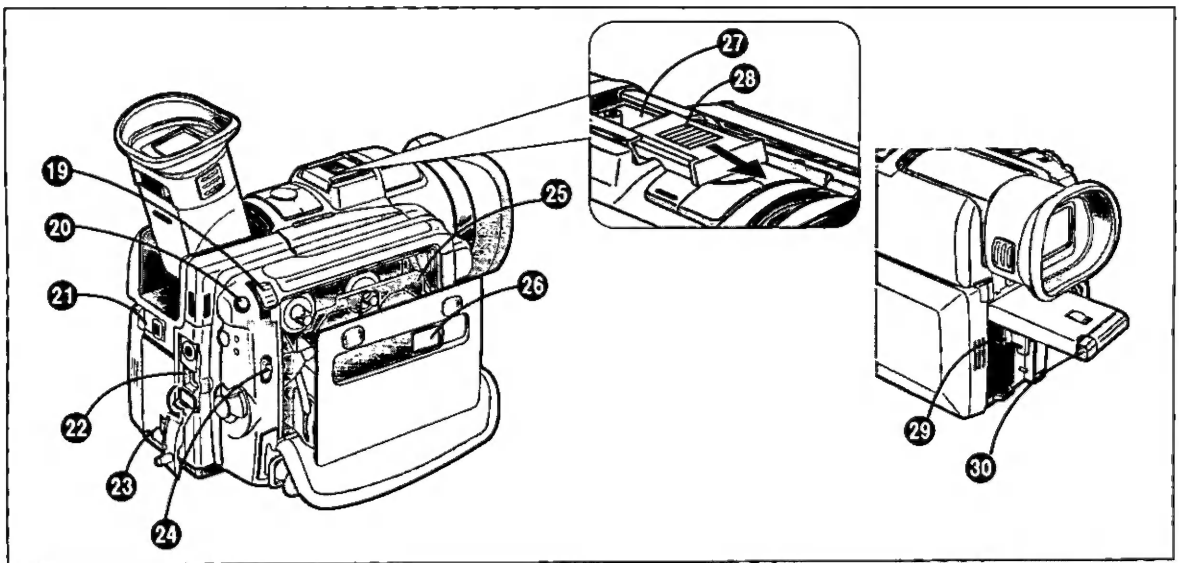
5. Shoulder Strap (→ 16)

6. Lens Cap (→ 16)

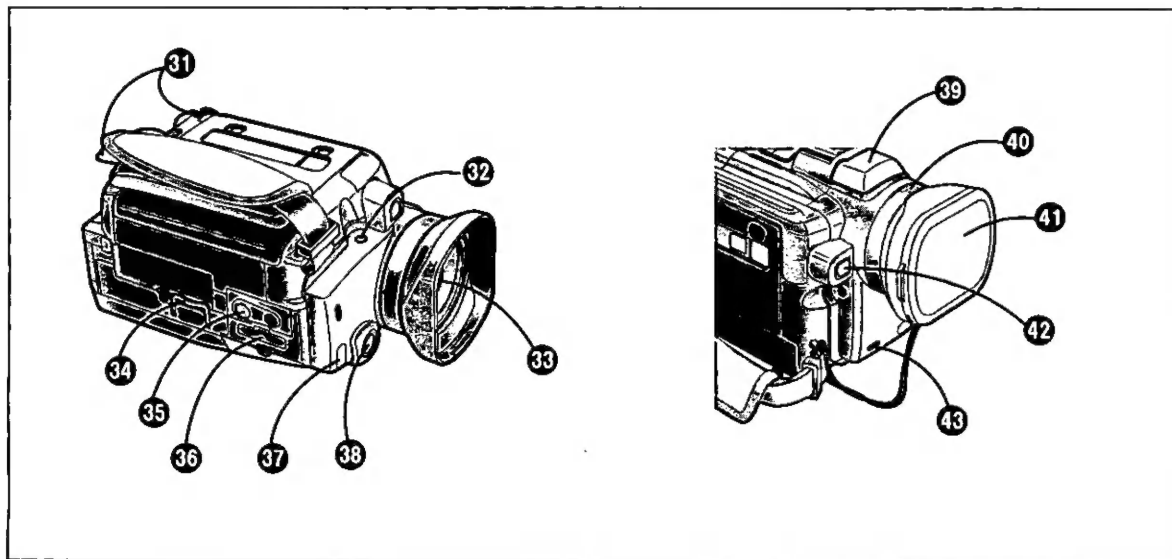


Controls and Components

- 1** Reverse Search Button/Rewind/Review Button/Recording Check Button [◀◀] (→ 18, 25, 26, 31)
- 2** Forward Search Button/Fast Forward/Cue Button [▶▶] (→ 26, 31)
- 3** Still Button/Pause Button [||] (→ 24, 28)
- 4** Fade Button/Stop Button [■] (→ 25, 36)
- 5** Play Button [▶] (→ 25)
- 6** Multi-Function [PUSH] Dial (→ 23, 24, 25, 28, 32, 37, 39, 44, 45, 62, 66, 68)
- 7** Mode Selector [AUTO/MANUAL/AE LOCK] (→ 17, 20, 37, 42, 43, 44, 45, 46)
- 8** Menu Button [MENU] (→ 23, 24, 32, 37, 39, 40, 41, 62, 66)
- 9** White Balance Button [W.B] (→ 42, 43)
- 10** LCD Monitor (→ 15)
- 11** Speaker (→ 25)
- 12** Finder (→ 15)
- 13** Eyepiece Corrector Knob (→ 15)
- 14** VCR (Playback) Mode/Camera (Recording) Mode Button (and Lamps) (→ 17, 25)
- 15** Recording Start/Stop Button (→ 17)
- 16** Power Switch [POWER ON/OFF] (→ 15, 17)
- 17** Cassette Compartment Close Button [PUSH TO CLOSE] (→ 14)
- 18** Grip Belt (→ 16)



- 19 Zoom Lever [W/T] (→ 21)**
- 20 Photoshot Button [PHOTO SHOT] (→ 22)**
- 21 LCD Monitor Open Lever [LCD OPEN] (→ 15)**
- 22 DV Terminal [DV IN/OUT] (→ 57)**
To input/output digital signals.
Connect it to digital video equipment with IEEE1394-compatible DV input/output terminal.
- 23 Battery Compartment Cover Open Lever [BATT DOOR OPEN] (→ 12)**
- 24 Cassette Eject Button [TAPE EJECT] (→ 14)**
- 25 Cassette Compartment (→ 14)**
- 26 Cassette Compartment Window (→ 14)**
- 27 Accessory Shoe**
To Attach the Stereo Zoom Microphone (optional).
- 28 Shoe Cover**
When using the Shoe, remove the Shoe Cover by sliding it in the direction of the arrow.
- 29 Battery Eject Lever (→ 12)**
- 30 Cover for DC Input Cable Slot (→ 11)**



31 Shoulder Strap Holders (→ 16)

32 Microphone Jack [EXT MIC]

To connect an external microphone or audio equipment. (Connecting to this jack deactivates the built-in microphone.)

Jack:	M3-type
Impedance:	Less than 4.7 kohm
Type:	Stereo
	(When connecting a mono microphone, no sound is recorded on the right channel.)
Sensitivity:	Approx. -50 dB
Power Source for Microphone:	Not available

33 Lens

34 Support Leg (→ 25)

35 Tripod Receptacle

To mount the Movie Camera on an optional tripod.

36 Multi Terminal [MULTI] (→ 29, 55)

37 Remote Control Sensor (→ 54)

38 Focus Button [FOCUS] (→ 20)

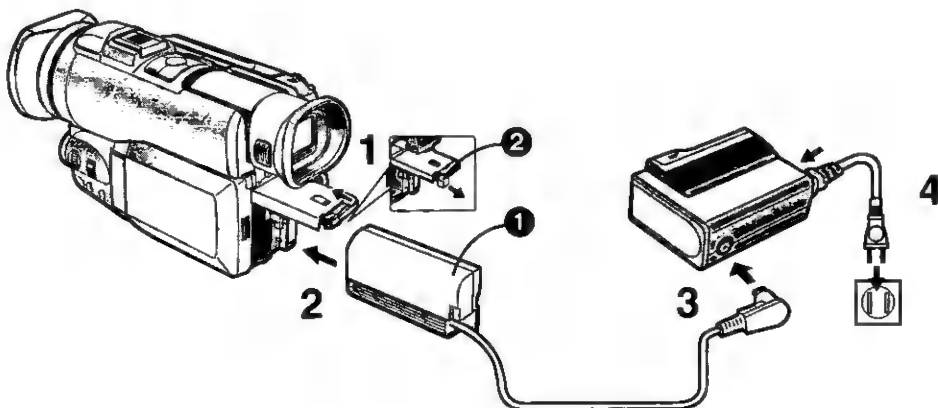
39 Microphone (built-in, stereo)

40 Manual Focus Ring (→ 20)

41 Lens Cap (→ 30, 43)

42 White Balance Sensor (→ 74)

43 Tally LED (→ 17)

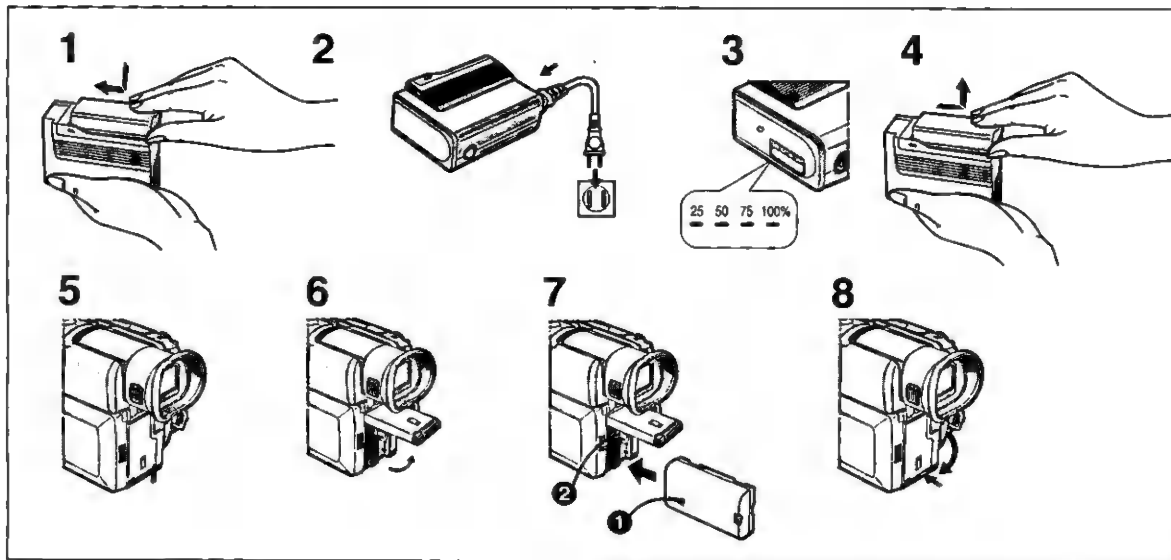


The 2 Types of Power Supplies

- 1) AC Adaptor (supplied) to supply power from an AC Outlet
- 2) Battery (supplied) (→ 12)

■ Supplying Power from an AC Outlet

- 1** Slide the [BATT DOOR OPEN] Lever upward to open the Battery Compartment Cover.
- 2** Insert the battery-shaped connector of the DC Input Cable ① into the Movie Camera. Pull back the Cover for the DC Input Cable Slot ② and lift it. Pass the DC Input Cable through the slot and close the Battery Compartment Cover.
- 3** Connect the other end of the DC Input Cable to the AC Adaptor.
- 4** Connect the AC Power Cord to an AC Outlet.
 - ◆ Before disconnecting the AC Power Cord, set the [POWER ON/OFF] Switch to [OFF].
 - ◆ If you use the Movie Camera for a long time, it becomes warm. However, this is normal.



■ Supplying Power with the Battery

The Battery was only minimally charged before shipping. Therefore, fully charge it before you use it for the first time.

- 1** Place the Battery on the AC Adaptor as shown above and slide it horizontally until it stops.
- 2** Connect the AC Power Cord to an AC Outlet.
- 3** When all four Charge Lamps on the AC Adaptor are lit, charging is finished.
- 4** Remove the Battery by sliding it in the opposite direction of Step 1 above.
 - Also disconnect the AC Power Cord.
- 5** Slide the [BATT DOOR OPEN] Lever.
- 6** Open the Battery Compartment Cover.
- 7** Insert the Battery with ❶ pointing inside.
- 8** Close the Battery Compartment Cover so that it locks with a click.

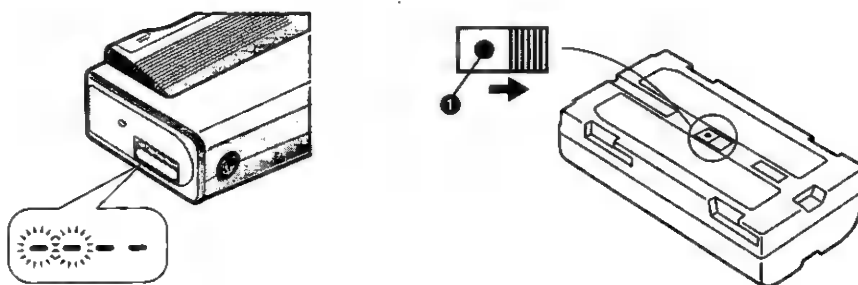
Removing the Battery

Open the Battery Compartment Cover and push the Battery Eject Lever ❷.

- ◆ Hold your hand over the Battery Compartment to prevent the Battery from dropping.
- ◆ Before removing the Battery, set the [POWER ON/OFF] Switch to [OFF].

Caution

Be sure to insert the Battery with the [▲] mark pointing into the Movie Camera. If you insert it with the mark pointing outside, it could damage the Movie Camera.



Charging Time and Maximum Time for Continuous Recording

Battery No.	Charging Time	Max. Continuous Recording Time
Supplied	80 min.	85 min. (70 min.)

(The times shown in the above chart are approximations. The figures in parentheses show the recording time when using the LCD Monitor.)

The times listed above for your information indicate the duration of recording performed at an ambient temperature of 20°C and 60% relative humidity. The charging time may be longer when you charge the Battery at higher or lower temperature.

- ◆ During use and charging, the Battery becomes warm. The Movie Camera, too, becomes warm during use.
- ◆ When you repeatedly stop and restart recording, the recording time per Battery is shorter than listed above.
- If you do not use the Battery for a long time, please read the Precautions for Storage (→ 71).

When the Charge Lamps Flash

When the internal temperature of the Battery or the ambient temperature is extremely high or low, the Charge Lamps on the AC Adaptor flash.

When the Charge Lamps flash slowly

The Battery is being charged, but charging takes longer than normally.

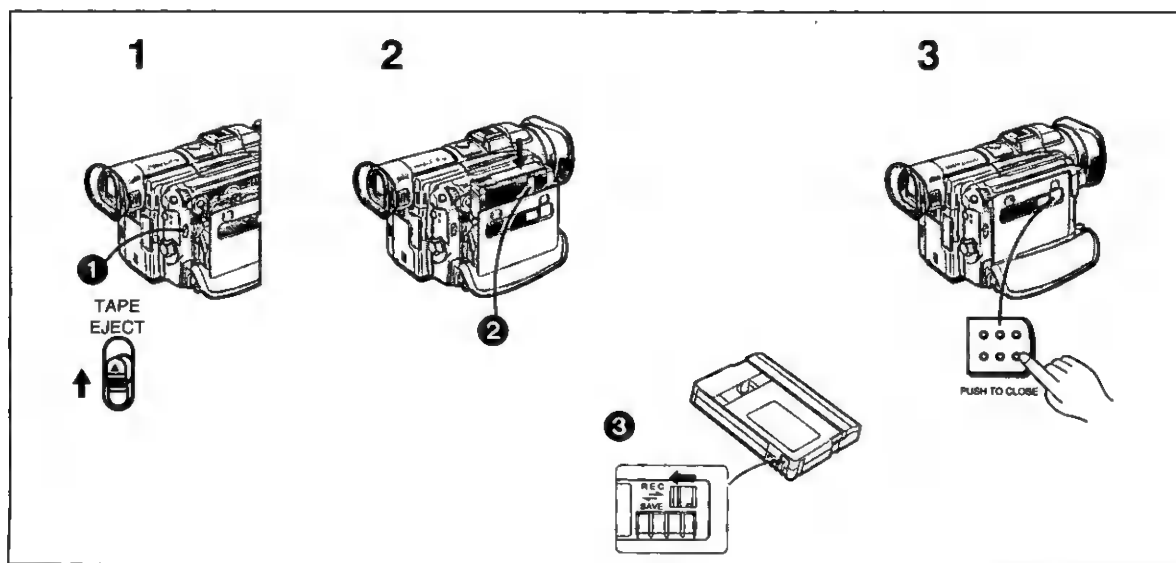
When the Charge Lamps flash in pairs

Charging is not possible. When the temperature becomes appropriate for charging, the Charge Lamps stop flashing and charging starts.

Using the Charge Confirmation Marker

You can use this marker to easily distinguish between charged and discharged Batteries.

For example, slide the knob so that the red dot (●) ① is visible after the charging is completed.



Inserting the Cassette

- 1** Slide the [TAPE EJECT] Lever ① upward to open the Cassette Compartment.
- 2** Insert the cassette.
Insert the cassette with its window in position ②.
- 3** Close the Cassette Compartment and press the [PUSH TO CLOSE] Button to lock the Cassette Compartment.

- If the Movie Camera is supplied with power, the above operation step 1 can be operated without turning on the Movie Camera.
- ◆ When opening or closing the Cassette Compartment, push down the Grip Belt so that it does not obstruct the opening and closing of the Cassette Compartment. Otherwise the Grip Belt may prevent the Cassette Compartment from opening completely, or it may get caught under the Cassette Compartment Cover and prevent it from closing properly.
- ◆ When inserting the cassette, make sure it faces in the right direction and then push in straight down until it stops.
- When you insert a cassette onto which you have recorded before, use the Camera Search Function (→ 31) to search for the position from which you want to continue recording.
- When you insert a new cassette, rewind the tape to the beginning before starting to record.

Preventing Accidental Erasure of Recordings

Opening the cassette's erasure prevention slider ③ (sliding it in the direction of the [SAVE] arrow) prevents recording. To record again, close the erasure prevention slider (slide it in the direction of the [REC] arrow).

■ LP Mode

The desired recording speed can be selected with [REC-SPEED] on the Menu. (→ 62,63)

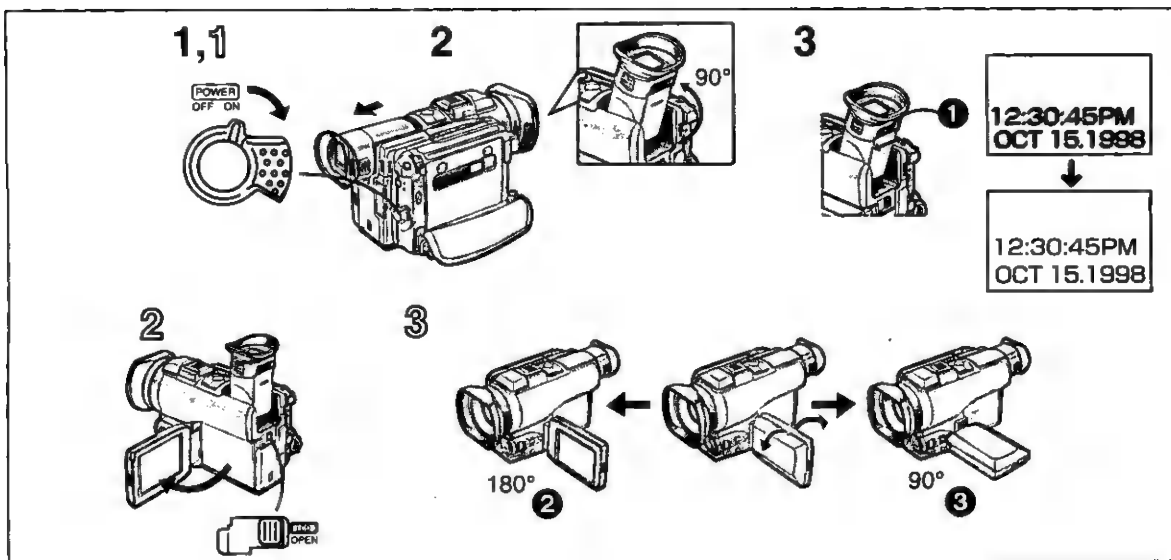
If you select the LP Mode, the possible recording time is 1.5 times as long as in the SP Mode.

Recording in the LP mode does not deteriorate the picture quality. However, the playback picture may contain mosaic-like patterns and certain functions may be restricted.

- In the following cases, mosaic-like patterns may appear in the playback picture, or the picture may not be played back correctly:
 - When a cassette recorded in the LP Mode on this Movie Camera is played back on other digital video equipment.
 - When a cassette recorded in the LP Mode on other digital video equipment is played back on this Movie Camera.
 - When a cassette recorded in the LP Mode on this Movie Camera is played back on digital video equipment not featuring the LP Mode.
- In the Slow Motion or Frame Advance Playback Mode. (→ 27, 28)
- When using the Camera Search Function. (→ 31)
- As the recording track width in the LP Mode is smaller than the head width, recording new sound onto an already recorded cassette (audio dubbing) (→ 49) is not possible.

NOTE

Concerning extended-play mini DV cassette tapes (standard play: 80 minutes/long play: 120 minutes) Please take note that extended-play mini DV cassette tapes (80 minutes in standard play mode; 120 minutes in long play mode) cannot be used with a DVCPRO or DVCPRO50 format VTR.



Using the Finder

Before using the Finder, adjust it to your eyesight so that the indications in the Finder are clear and easy to read.

1 Set the [POWER ON/OFF] Switch to [ON].

2 Slide the Finder backward.

The angle of the Finder can be adjusted upward. However, be sure to slide the Finder backward until it stops, before turning it upward.

- Be careful not to get your fingers pinched when turning the Finder upward.

3 Adjust by sliding the Eyepiece Corrector Knob ①.

You can adjust the brightness of the Finder on the Menu. (→ 62-65, 68)

Using the LCD Monitor

It is also possible to record while viewing the picture on the opened LCD Monitor.

1 Set the [POWER ON/OFF] Switch to [ON].

2 Push the [LCD OPEN] Lever and turn out the LCD Monitor approximately 90° in the direction of the arrow.

The Finder turns off.

Adjusting the Angle

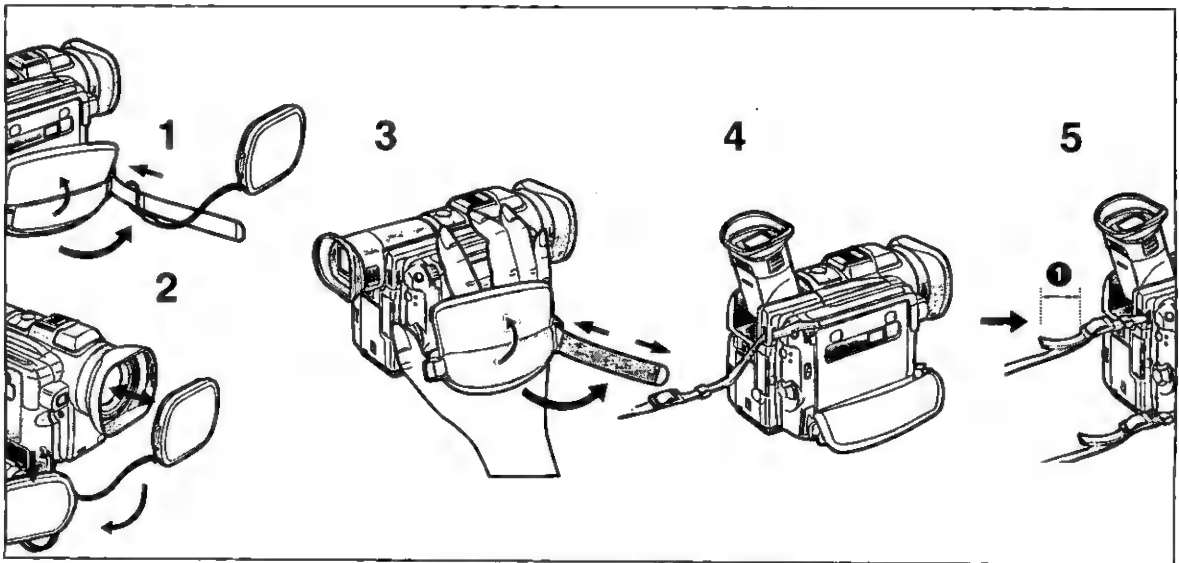
3 Adjust the angle of the LCD Monitor according to the desired recording angle.

- ◆ The LCD Monitor rotates upward a maximum of 180° ② and downward a maximum of 90° ③ from its normal vertical position. Trying to forcefully rotate it beyond this range could seriously damage the Movie Camera.

- You can adjust the color level and brightness of the LCD Monitor on the Menu. (→ 62-65, 68)

Closing the LCD Monitor

Push the LCD Monitor until the [LCD OPEN] Lever clicks. -15-



Using the Lens Cap

- 1** Open the end of the Grip Belt and pull it through the loop of the Lens Cap's string.

Before you start recording, remove the Lens Cap.

- 2** You can hook the removed Lens Cap onto the Grip Belt.

When not actually recording, always attach the Lens Cap to the Lens to protect it.

Adjusting the Grip Belt

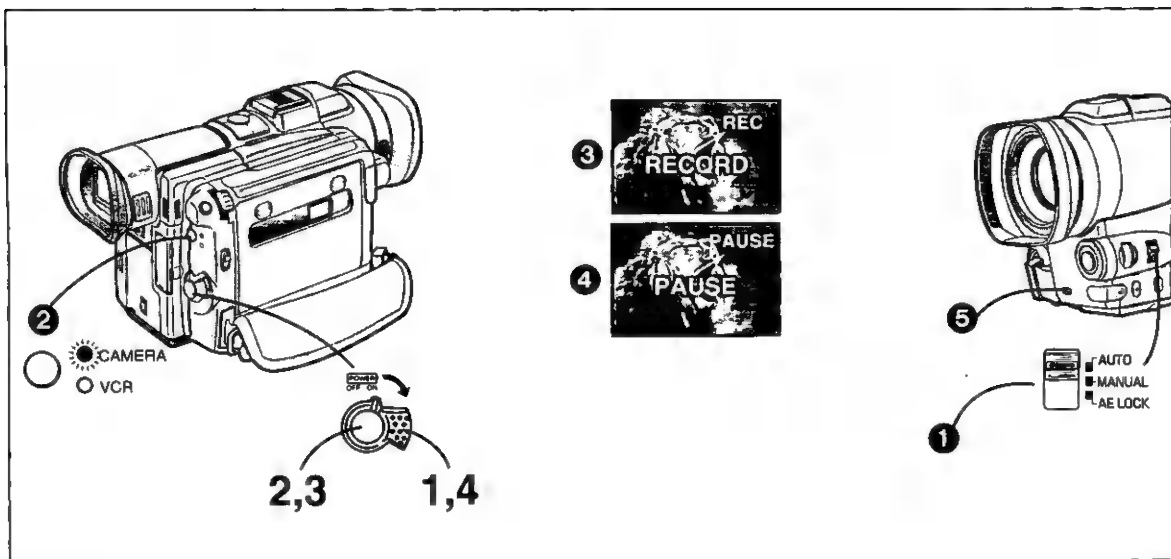
You can adjust the Grip Belt to the size of your hand.

- 3** Open the Grip Belt Cover and adjust the length of the Grip Belt.

Attaching the Shoulder Strap

Before you go recording outside, we recommend that you attach the Shoulder Strap to prevent the Movie Camera from dropping accidentally.

- 4** Pull the end of the Shoulder Strap through the Shoulder Strap Holder on the Movie Camera.
- 5** Fold the end of the Shoulder Strap back and pull it through the Shoulder Strap Length Adjuster.
Pull it out more than 2 cm ❶ from the Shoulder Strap Length Adjuster so that it cannot slip off.
- 6** Pull the other end of the shoulder Strap through the metal ring attached to the Grip Belt.
- 7** Fold the end of the Shoulder Strap back and pull it through the Shoulder Strap Length Adjuster.



Recording

When the Mode Selector is set to [AUTO] ①, you can simply turn on the Movie Camera and press the Start/Stop Button to start recording, and the focus and white balance are adjusted automatically.

- Depending on the light source and recording situation, correct automatic focusing and white balance adjustment may not be possible. In such cases, adjust them manually.

Focus: (→ 20); White Balance: (→ 42, 43)

1 Set the [POWER ON/OFF] Switch to [ON].

The [CAMERA] Lamp lights. ②

2 Press the Start/Stop Button.

Recording starts.

The [RECORD] Indication appears briefly and then changes to [REC]. ③

3 To pause recording:

Press the Start/Stop Button again.

The [PAUSE] Indication appears. ④

4 To finish recording:

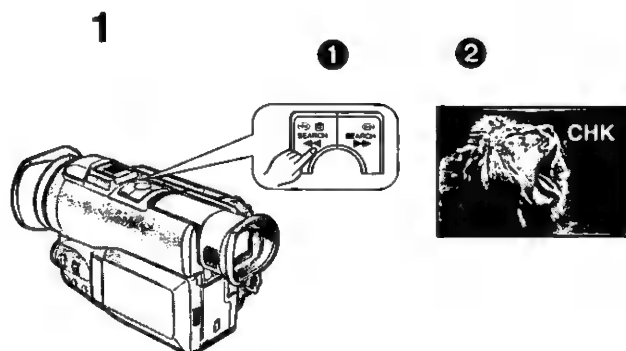
Set the [POWER ON/OFF] Switch to [OFF].

- ◆ If you leave the Movie Camera in the Recording Pause Mode for more than 5 minutes, it automatically switches off to protect the tape and to conserve battery power. To resume recording from this condition, set the [POWER ON/OFF] Switch to [OFF] and then to [ON] again.

Tally-LED

The Tally LED ⑤ lights during recording to indicate that recording is being performed.

If you select [OTHERS] on the Menu and then set [TALLY-LED] to [OFF], the Recording Lamp does not light. (→ 62-64)



Checking If the Picture Is Recorded (Recording Check)

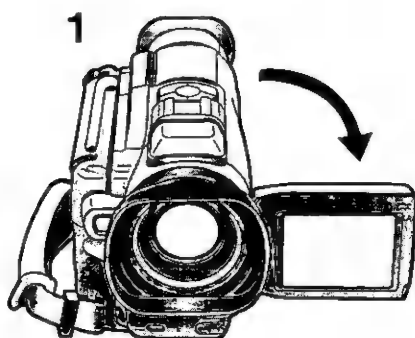
To play back the final few seconds of the last recorded scene in the Recording Pause Mode.

- 1 Press the Reverse Search Button [◀◀]**
① briefly in the Recording Pause Mode.

The [CHK] Indication ② appears.

After checking, the Movie Camera returns to the Recording Pause Mode.

- ◆ For Recording Check, the Movie Camera must be in the same mode (SP or LP) as used for recording, otherwise the playback picture is distorted.



Recording Yourself

(Recording with the LCD Monitor Facing Forward)

This makes it possible to record yourself while viewing the picture on the LCD Monitor or to show the persons in front of the Movie Camera the picture being recorded.

1 Open the LCD Monitor and turn it so that it faces forward (lens side).

Opening the LCD Monitor automatically turns off the Finder. However, when you turn the LCD Monitor forward, the picture also appears in the Finder.

This lets you aim the Movie Camera and view the picture in the Finder, while the persons in front of the Movie Camera can check the picture on the LCD Monitor during recording.

Mirror Mode


When recording yourself with the LCD Monitor facing forward, the picture as it is being recorded might look unusual to you. If you prefer seeing yourself on the LCD Monitor the way you see yourself in a mirror, select the Mirror Mode:

Selecting [OTHERS] on the Menu and then setting [SELF-REC] to [MIRROR] reverses the picture on the LCD Monitor and shows it as a mirror-image.

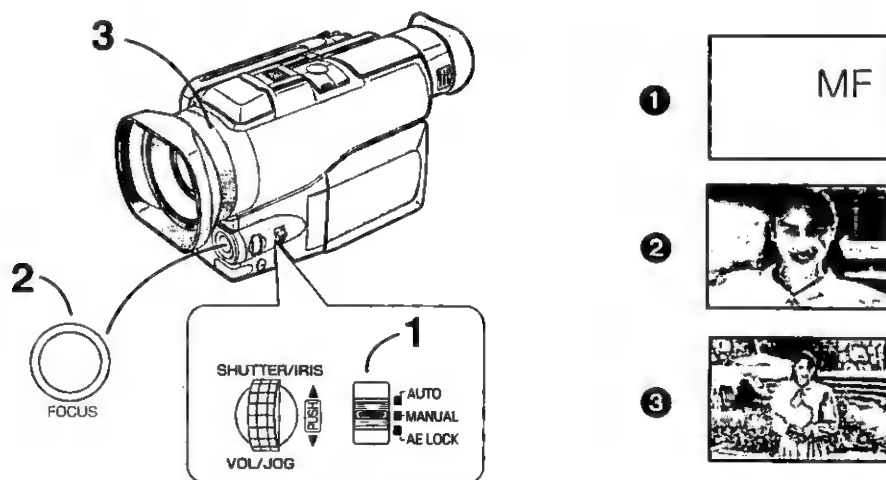
(→ 62-64)

However, even if you have selected the Mirror Mode, the picture is recorded in the normal way.

◆ In the Mirror Mode, only the following indications are displayed.

- : Recording
- ||: Recording Pause
- : Remaining Battery Power

When the General Warning/Alarm Indication [!] appears, turn the LCD Monitor backward so that you can confirm the actual Warning/Alarm Indication.



Manually Focusing on the Subject (Manual Focus)

This makes it possible to adjust the focus manually for subjects and recording situations for which automatic focusing is not precise.

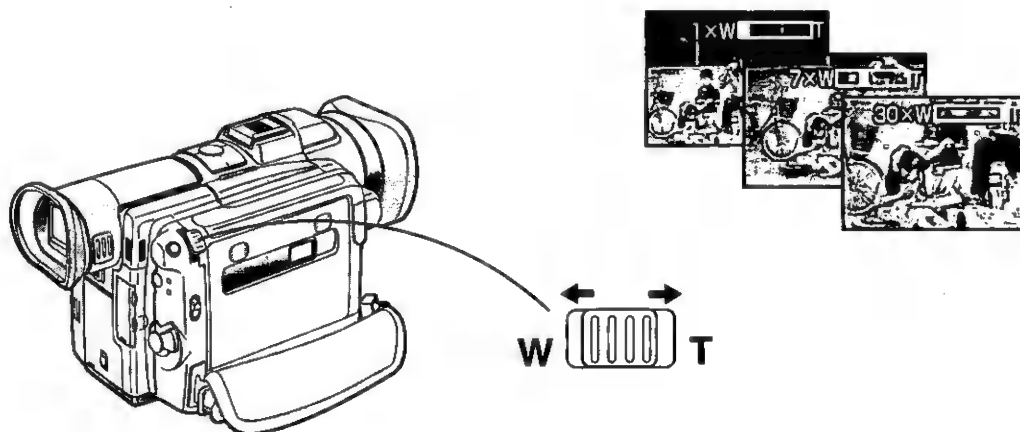
- 1 Set the Mode Selector to [MANUAL].**
The [MNL] Indication appears.
- 2 Press the [FOCUS] Button to make the [MF] Indication ❶ appear.**
- 3 Turn the Manual Focus Ring on the Lens to adjust the focus.**

Changing Back to Automatic Focusing

Keep the [FOCUS] Button pressed until the [MF] Indication disappears.

Hint for Manual Focus Adjustment

- ◆ If you adjust the focus in the wide-angle setting, the subject may go out of focus when you enlarge it. Therefore, enlarge the subject ❷ before you adjust the focus, so that the picture remains focused when you zoom out ❸.



Enlarging Your Subject or Widening the Recording Angle (Zooming In/Out)

Recording close-ups of your subjects and recording wide-angle shots add special effects to your videos.

- 1 To record a wider view (Zooming-out):
Push the [W/T] Zoom Lever toward [W].
To enlarge your subject (Zooming-in):
Push the [W/T] Zoom Lever toward [T].**

- The Zoom Magnification Indication appears for a few seconds.
- The farther you push the [W/T] Zoom Lever toward [W] or [T], the faster the zooming speed becomes.
- ◆ During recording, the zooming speed is slower than during recording pause.

Enlarging Your Subjects Even More (Digital Zooming)

Selecting one of the two settings for [D.ZOOM] on the Menu makes it possible to further enlarge the subject.
(→ 62, 63)

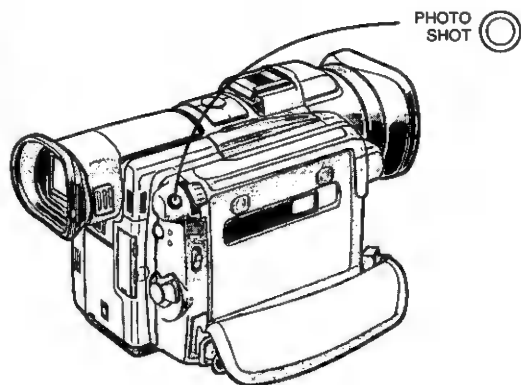
- **×30:** Digital zooming up to 30×.
- **×120:** Digital zooming up to 120×.
- Up to 12×, the zooming is done optically.
- ◆ The higher the Digital Zoom Magnification is, the lower is the picture quality.
- ◆ If you set [D.ZOOM] on the Menu to [30×] or [120×], the [D.ZOOM] Indication appears.

Recording Extra Close-up Shots of Small Subjects (Macro Close-up Function)

When the zoom magnification is 1×, the Movie Camera can focus on subjects down to a distance of approximately 30 mm between lens and subject. This allows recording very small subjects such as insects.

- When you have zoomed to the tele setting, precise focusing is only possible on subjects no closer than 1.2 metres.

1



Using the Movie Camera as a Digital Still Camera (Photoshot)

With this function, you can record still pictures with sound for approximately 7 seconds each.

This function is convenient for example for pictures that you want to print on a Video Printer.

1 Press the [PHOTO SHOT] Button. (This function can be used during recording, too.)

The Movie Camera records a still picture for approximately 7 seconds and then switches over to the Recording Pause Mode.

- The image on the LCD Monitor or in the Finder also stands still.

If you select [SHUTTER] to [ON] on the Menu, the screen blinks briefly and a simulated shutter click sound can be heard when you press the [PHOTO SHOT] Button.

- With the still pictures that you have recorded in the Photoshot Mode, you can do the following:

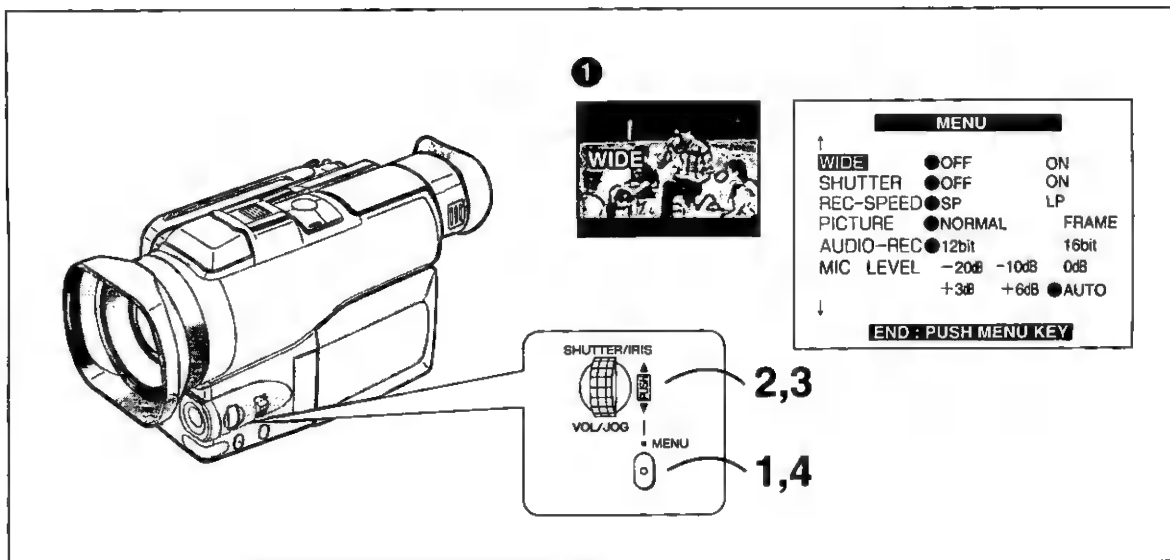
- Index Search (→ 33)

(However, searching for the picture(s) recorded at the beginning of the tape may not be possible.)

- ◆ If you select [SHUTTER] to [ON] on the Menu [SHUTTER] to [ON], the visual shutter effect and the click sound are also recorded. (There is a slight delay between pressing the [PHOTO SHOT] Button and the actual start of recording. The visual shutter effect and click sound may occur with slight delay after recording of the still picture has started.)

- ◆ The picture quality deteriorates slightly.

- ◆ Using the Photoshot Function makes the Remaining Tape Time Indication disappear. Resuming normal recording makes the Remaining Tape Time Indication appear again.



Recording in the Wide Mode

(Wide Mode)

This mode lets you record in the Wide-Screen format.

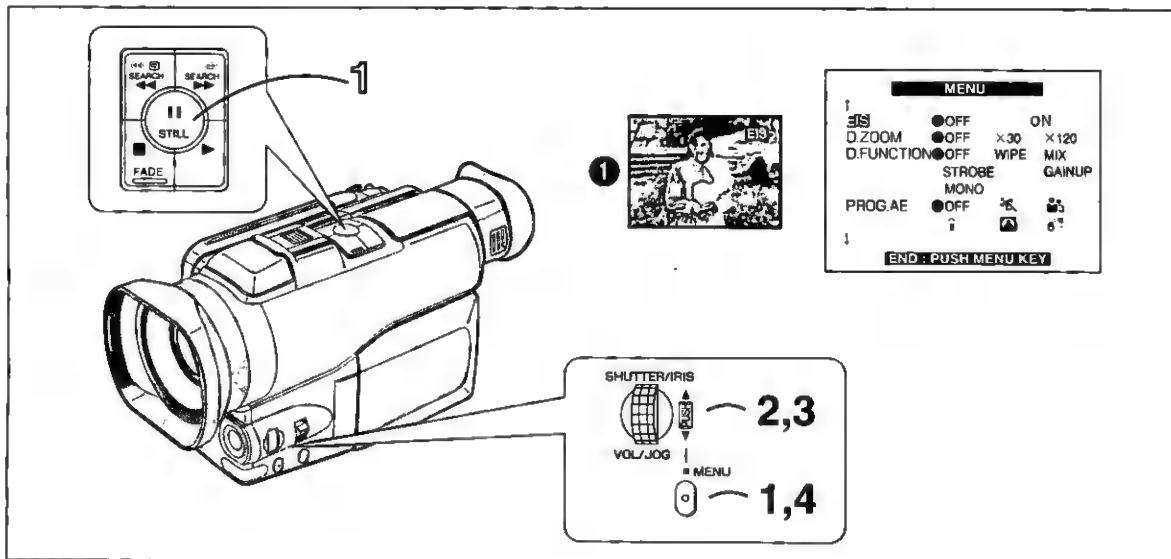
- 1 Press the [MENU] Button.**
The Menu appears.
- 2 Turn the [PUSH] Dial to select [WIDE].**
- 3 Press the [PUSH] Dial to select [ON].**
- 4 Press the [MENU] Button to exit the Menu.**

◆ In the Wide Mode, black bars appear at the top and bottom of the LCD Monitor and the Finder screen.

1

Cancelling the Wide Mode

Set [WIDE] on the Menu to [OFF].



Recording with Minimized Camera Shake (Electronic Image Stabilizer)

In recording situations where shaking of the Movie Camera is likely to happen, for example when you have zoomed in on a distant subject or when you record while walking, you can use this function to stabilize the image.

◆ In case of very strong camera shake, it may not be possible to stabilize the picture.

1 Press the [MENU] Button.

The Menu appears.

2 Turn the [PUSH] Dial to select [EIS].

3 Press the [PUSH] Dial to select [ON].

4 Press the [MENU] Button to exit the Menu.

The [EIS] Indication ① appears.

◆ In a dimly lit place, the Electronic Image Stabilizer Function may not work.

◆ Under fluorescent lamps, the picture brightness may fluctuate and the colors may be unnatural.

◆ The picture quality may deteriorate slightly.

◆ The subject becomes slightly enlarged.

• When you use a tripod, we recommend that you set [EIS] to [OFF].

Cancelling the Electronic Image Stabilizer Function

Set [EIS] on the Menu to [OFF].

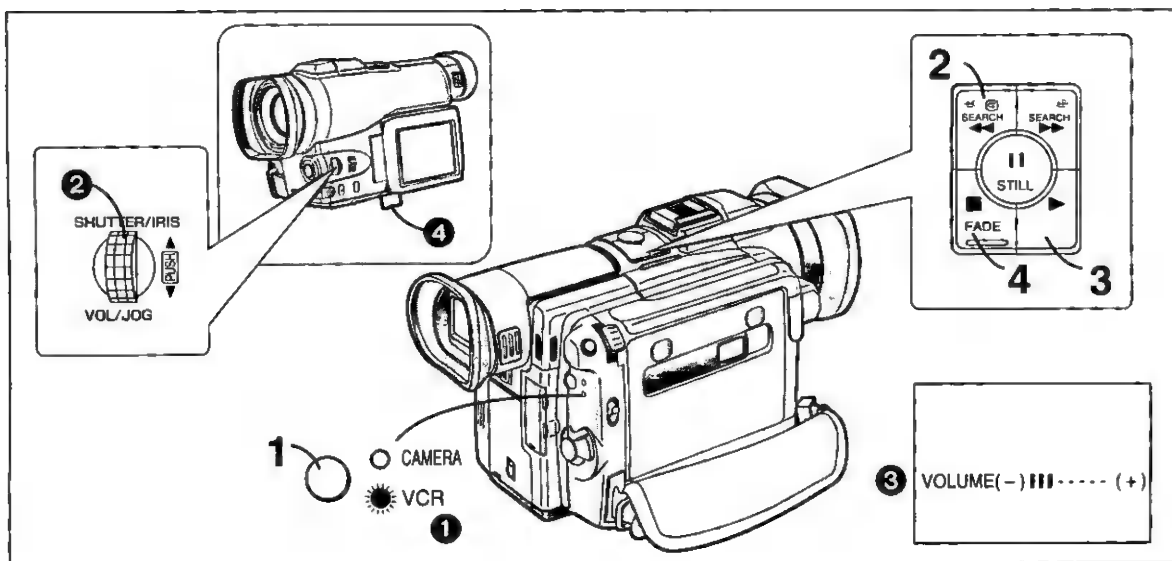
Recording Still Pictures

You can record still pictures of any desired duration together with sound either in the middle of a normal recording or from the Recording Pause Mode.

1 Press the [Still] Button [II].

Cancelling the Still Picture Recording Mode

Press the [Still] Button [II] again.



Viewing the Just Recorded Scenes on the Movie Camera (Playback)

You can play back recorded scenes right after recording.

- 1** Press the [VCR/CAMERA] Button so that the [VCR] Lamp **1** lights.
- 2** Press the Rewind Button [◀◀] to rewind the tape.
 - Rewind the tape to the point where the recording started.
 - If the tape reaches the beginning, rewinding automatically stops.
- 3** Press the Play Button [▶] to start playback.
- 4** To stop playback:
Press the Stop Button [■].

■ Adjusting the Sound Volume

Keep the [PUSH] Dial **2** pressed until the [VOLUME] Indication **3** appears. Then, turn the [PUSH] Dial to adjust the volume.

To make the [VOLUME] Indication disappear, press the [PUSH] Dial again until the [VOLUME] Indication has disappeared.

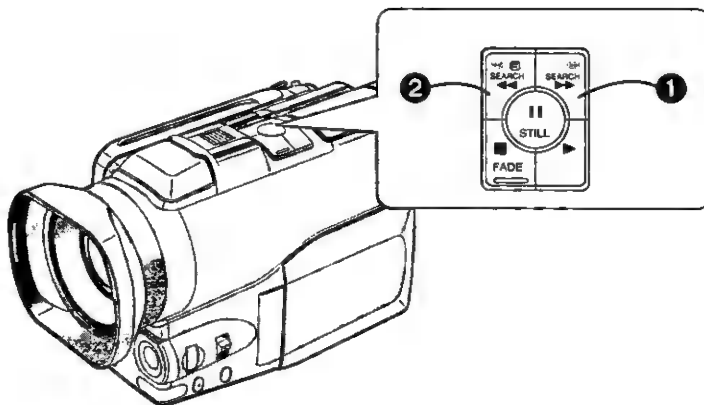
Making the Date/Time Indication Appear

This Movie Camera automatically records the date and time, however not directly in the picture but as part of the sub code (→ 73).

To make the Date/Time Indication appear, set [DATE/TIME] on the Menu to the desired setting.

Using the Support Leg for Easy-to-View Playback

Extending the Support Leg **4** from the underside of the Movie Camera makes it easier to view the playback picture on the LCD Monitor.



Searching for a Scene You Want to Play Back

Cue Playback

Keep the Cue Button [▶▶] ① pressed during playback.

Review Playback

Keep the Review Button [◀◀] ② pressed during playback.

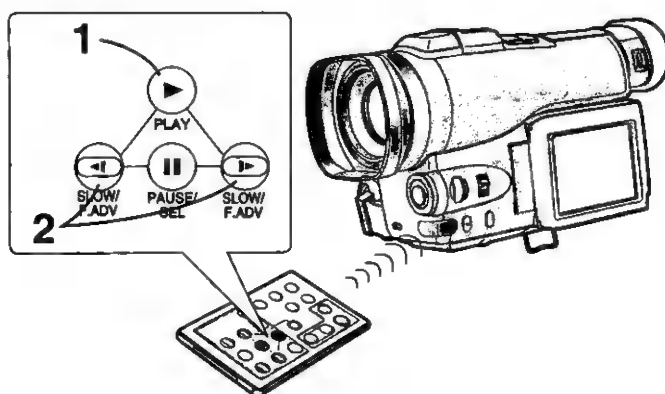
Search Lock Function

For longer Cue or Review Playback, press the Cue Button [▶▶] or the Review Button [◀◀] only briefly. As this locks the search function, you do not need to keep the button pressed for a long time.

- To resume normal playback, press the Play Button [▶].
- In Cue and Review Playback, pictures with fast-moving subjects may contain mosaic-like patterns.

Hyper Check Function

- If you press the Fast-forward Button [▶▶] during fast-forwarding of the tape or the Rewind Button [◀◀] during rewinding of the tape, Cue Playback or Review Playback continues for as long as you keep the Button pressed.
- ◆ Before and after activating Cue Playback or Review Playback, the picture may momentarily be distorted.



Playing Back in Slow Motion

(Slow Motion Playback)

- 1** Press the Play Button [▶].
- 2** Press the Slow Motion/Frame Advance Button [◀] or [▶] on the Remote Controller.

Pressing the [◀] Button starts slow motion playback in reverse direction, and pressing the [▶] Button starts slow motion playback in forward direction.

Scenes recorded in the SP Mode are played back at approximately 1/5th of the normal speed.

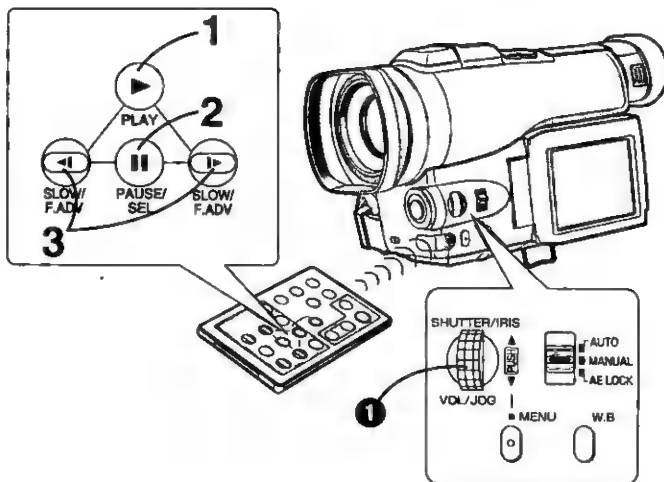
Scenes recorded in the LP Mode are played back at approximately 1/3rd of the normal speed.

Resuming Normal Playback

Press the Play Button [▶].

Playback continues with normal speed.

- During slow motion playback in reverse direction, the Time Code Indication may not be accurate.



Playing Back Still Pictures and Advancing Them One by One

(Still Playback/Frame Advance Playback)

You can freeze the action during playback and advance the still pictures one by one.

1 Press the Play Button [▶].

2 Press the Pause Button [⏸].

The playback picture stops in the Still Playback Mode.

3 Press the Slow Motion/Frame Advance Button [◀] or [▶] on the Remote Controller.

Pressing the [◀] Button advances the still picture frame by frame in reverse direction. Pressing the [▶] Button advances the still picture frame by frame in forward direction.

Resuming Normal Playback

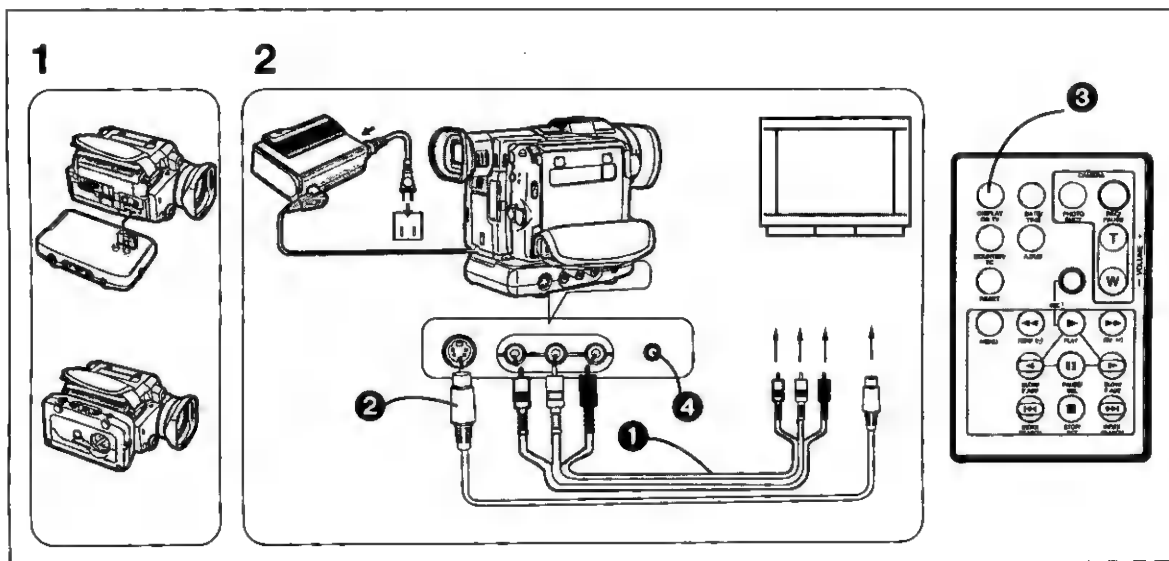
Press the Play Button [▶].

Playback continues with normal speed.

- If you keep the [▶] Button on the Remote Controller pressed for more than 1 second during Frame Advance Playback, the Movie Camera switches over to the Slow Motion Playback Mode with slower speed than in the normal Slow Motion Playback Mode.
- ◆ If you leave the Movie Camera in the Still Playback Mode for more than 5 minutes, it switches over to the Stop Mode to protect the video heads against excessive wear.
- ◆ During Frame Advance Playback, the Time Code Indication may not be accurate.

Using the Jog Dial (Jog Playback)

By turning the Jog Dial ([PUSH] Dial) ① on the Movie Camera in the Still Playback Mode, you can advance the still pictures one by one in forward or reverse direction.



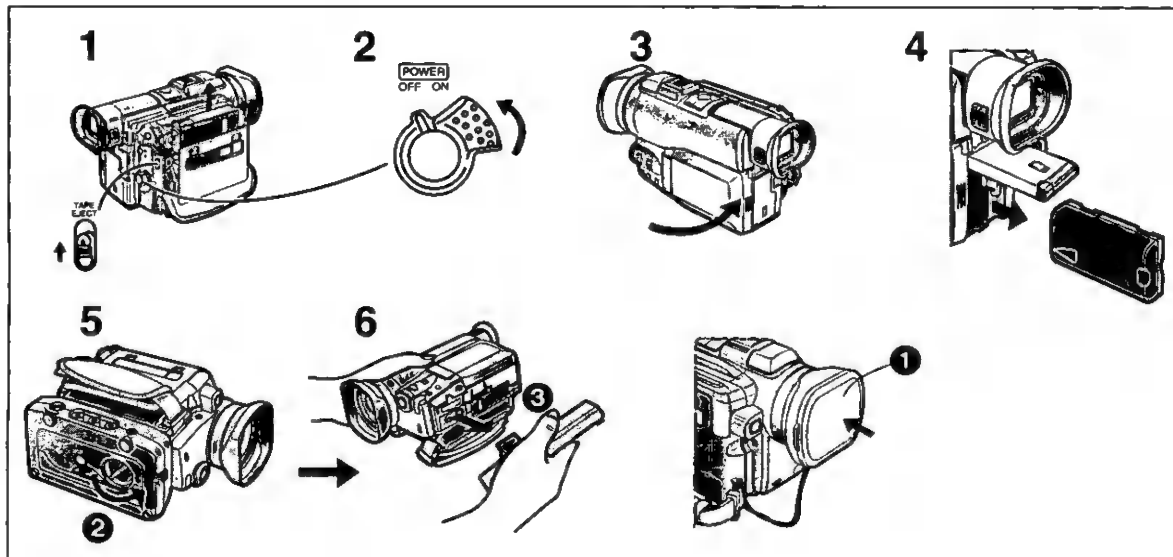
Attaching the Docking Station to the Movie Camera makes it possible to play back recorded scenes on a TV.

2 Connect the Video and Audio Output Jacks to the Video and Audio Input Jacks on the TV.

- ◆ Before connecting, turn off both the Movie Camera and the TV.
- ◆ If a cassette recorded with copyright protection signal is played back, the screen becomes blue. However, scenes recorded with this Movie Camera do not contain a copyright protection signal.

Making the Indications Appear on the TV Screen

Playing Back the Sound via Headphones



After Use

- 1** Take out the cassette. (→ 14)
- 2** Set the [POWER ON/OFF] Switch to [OFF].
- 3** Retract the Finder and close the LCD Monitor.
- 4** Take out the Battery. (→ 12)

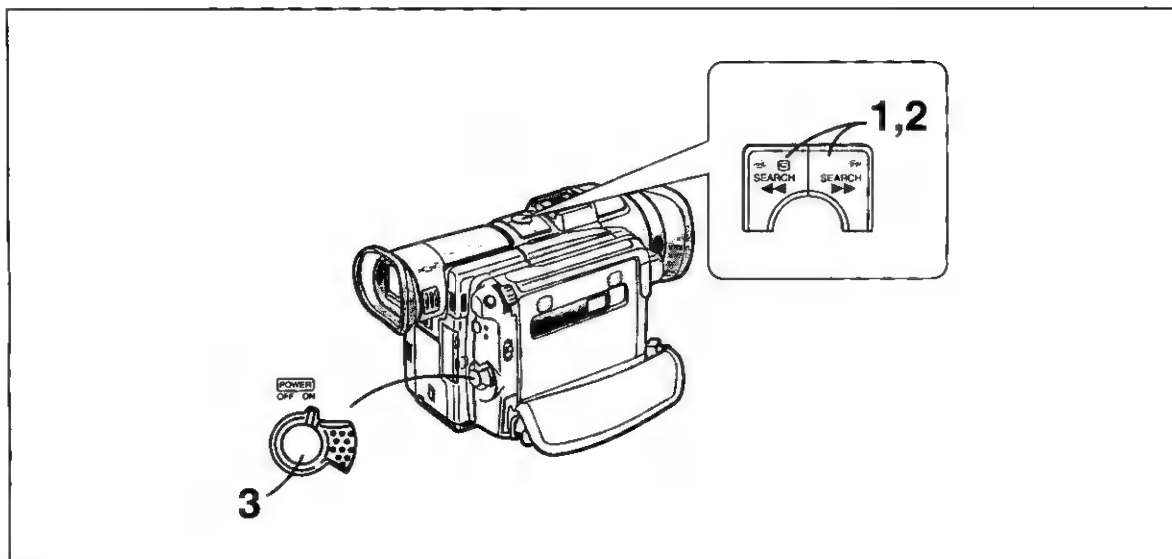
Attaching the Lens Cap ①

After use, attach the supplied Lens Cap to the Lens to protect it.

Removing the Docking Station

If the Docking Station is attached to the Movie Camera, remove it in the following way:

- 5** Turn the Locking Handle in the direction of the arrow ②.
- 6** Pull off the Docking Station in the direction of the arrow ③.



Viewing Recorded Scenes During Recording Pause (Camera Search)

You can view recorded scenes when the Movie Camera is in the Recording Pause Mode. The Camera Search Function is convenient to search for a scene from which you want to start recording a new scene with smooth scene-to-scene transition.

1 Keep the Reverse Search Button [◀◀] or the Forward Search Button [▶▶] pressed for more than 1 second.

Pressing the [◀◀] Button plays back the picture in reverse direction.

Pressing the [▶▶] Button plays back the picture in forward direction.

Starting to Record from the Desired Position

2 Release the pressed Search Button.

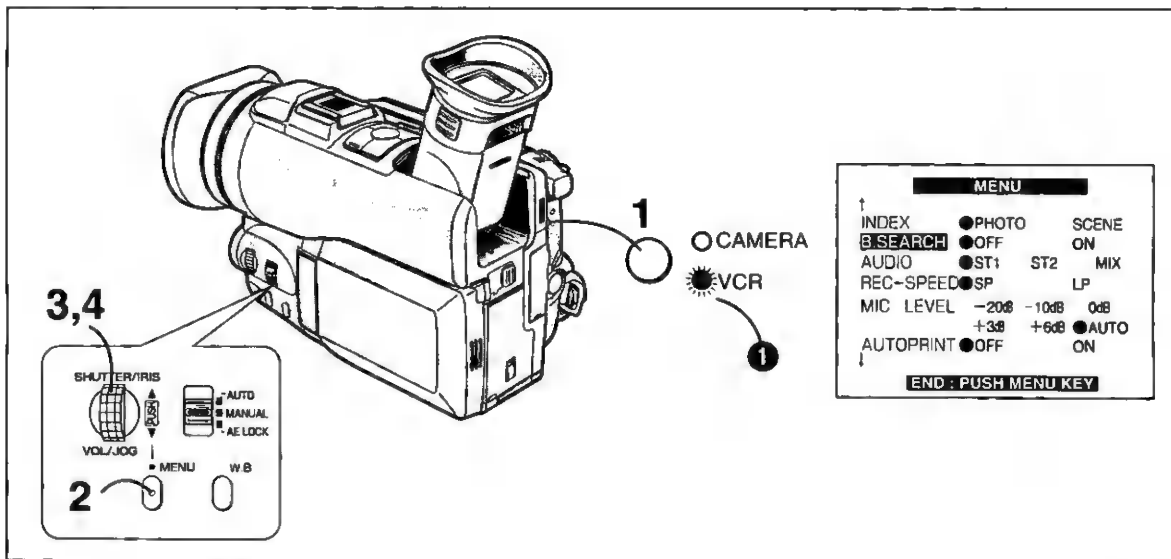
The Movie Camera is in the Recording Pause Mode.

3 Press the Start/Stop Button to start recording.

The Movie Camera starts recording a new scene with smooth scene-to-scene transition.

- In the Camera Search Mode, the picture may contain mosaic-like patterns. However, this is a phenomenon particular to digital video and completely normal.

- ◆ If the Recording Speed Mode (SP/LP) of the previous and the new recording are different, the playback picture may be distorted.



Searching for the End of the Recorded Part on a Cassette (Blank Search)

With the Blank Search Function, you can quickly locate the end of the recorded part on a cassette (or a blank part between recordings).

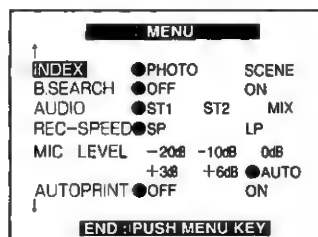
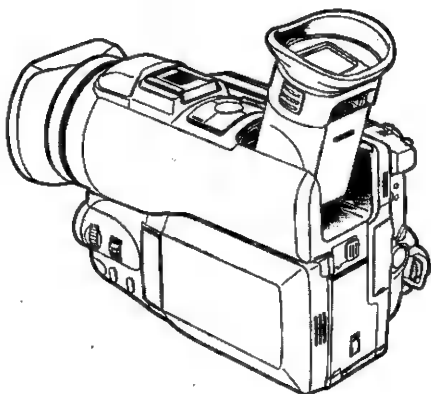
1 Press the [VCR/CAMERA] Button so that the [VCR] Lamp lights. ❶

2 Press the [MENU] Button.
The Menu appears.

3 Turn the [PUSH] Dial to select [B.SEARCH].

4 Press the [PUSH] Dial to select [ON].
Approximately 1 second before the end of the last recorded scene, the Movie Camera switches over to the Still Playback Mode.

- If there is no blank part on a cassette, the Movie Camera stops at the end of the tape.
- When the Blank Search has finished, you can press the [VCR/CAMERA] Button so that the [CAMERA] Lamp lights, and then start recording. The new scene is recorded with a smooth transition from the last to the new scene.



Searching for the Beginning of Recorded Scenes Marked with Index Signal

(Index Search)

Index Search

To allow easy searching for desired scenes, this Movie Camera automatically records index signals during recording as follows:

1 Photoshot Index Signal

To search for still pictures recorded in the Photoshot Mode (→ 22).

A photoshot index signal is automatically recorded every time you record a still picture in the Photoshot Mode.

2 Scene Index Signal

To search for the beginning of recorded scenes.

A scene index signal is automatically recorded in the following cases:

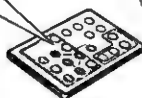
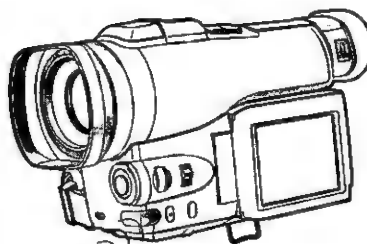
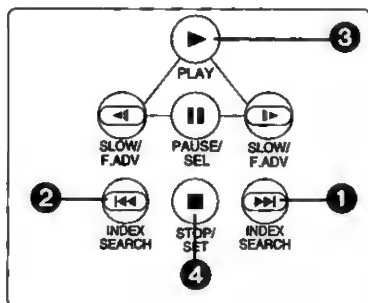
- When you start recording after inserting a cassette.
- Depending on the setting of [INDEX] on the Menu

(→ 62,65):

[2HOUR]: An index signal is recorded when recording is restarted after a lapse of more than 2 hours.

[DAY]: An index signal is recorded when recording is restarted after the date has changed since the last recording.

(While an index signal is being recorded, the [INDEX] Indication flashes for a few seconds.)



Searching for Photoshot Pictures

(Photoshot Index Search)

- Press the [VCR/CAMERA] Button on the Movie Camera so that the [VCR] Lamp lights.
- Set [INDEX] on the Menu to [PHOTO]. (→ 62, 65) (The initial setting is [PHOTO].)

Photoshot Index Search in Forward Direction

Press the Index Button [▶▶] ① on the Remote Controller.

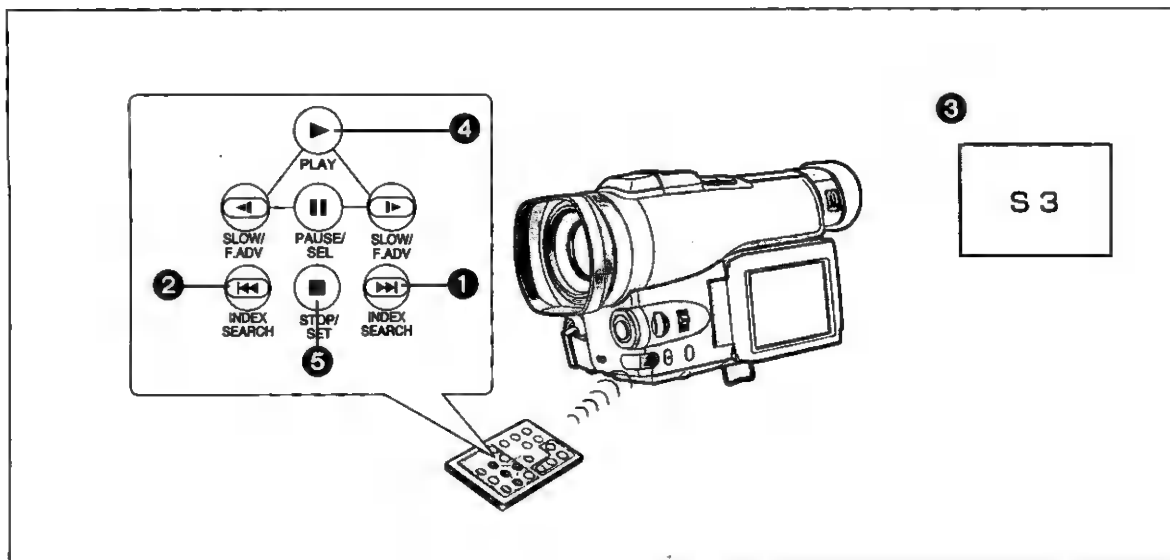
Photoshot Index Search in Reverse Direction

Press the Index Button [◀◀] ② on the Remote Controller.

- At every press of the corresponding button, the tape is fast-forwarded or rewound to the next still picture recorded in the Photoshot Mode.

After reaching the next still picture, the still picture is played back continually, however the sound only for approximately 4 seconds. (If you leave the Movie Camera in the Still Playback Mode for more than 6 minutes, it switches over to the Stop Mode to protect the video heads against excessive wear).

- ◆ The Photoshot Index Search may not work correctly for still pictures recorded near the beginning of the tape.
- If you keep the [◀◀] or [▶▶] Button pressed for more than 2 seconds, the Intro Search Function is activated and it plays back all still pictures recorded in the Photoshot Mode on the cassette one after another for a few seconds each.
(To cancel the Intro Search Function, press the Play Button [▶] ③ or the Stop Button [■] ④.)



Searching for the Beginning of Recorded Scenes (Scene Index Search)

- Press the [VCR/CAMERA] Button on the Movie Camera so that the [VCR] Lamp lights.
- Set [INDEX] on the Menu to [SCENE]. (→ 62, 65)

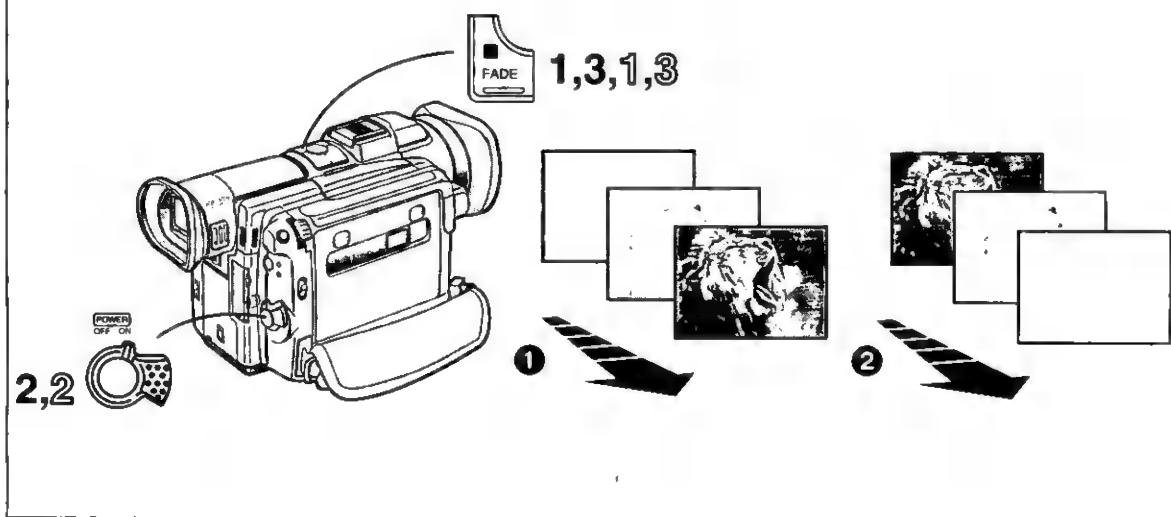
Scene Index Search in Forward Direction

Press the Index Button [▶▶] ① on the Remote Controller.

Scene Index Search in Reverse Direction

Press the Index Button [◀◀] ② on the Remote Controller.

- When you briefly press the corresponding button once, the [S1] Indication appears and the search for the next scene marked with an index signal starts. After the Scene Index Search has started, every time you press the button, the indication changes successively from [S2] to [S9], and the beginning of the scene corresponding to the selected number is located. ③ After reaching the desired scene, playback starts automatically. (At a time, Scene Index Search in forward or reverse direction is possible up to the ninth scene marked with index signal from the present tape position.)
- ◆ If the interval between two scene index signals is less than 1 minute, the Scene Index Search may not work correctly.
- ◆ The Scene Index Search may not work correctly for scenes recorded near the beginning of the tape.
- If you keep the [◀◀] or [▶▶] Button pressed for more than 2 seconds, the Intro Search Function is activated and it plays back the beginning of all scenes marked with an index signal on the cassette one after another for a few seconds each.
(To cancel the Intro Search Function, press the Play Button [▶] ④ or the Stop Button [■] ⑤.)



Fading In/Out

Fading In ①

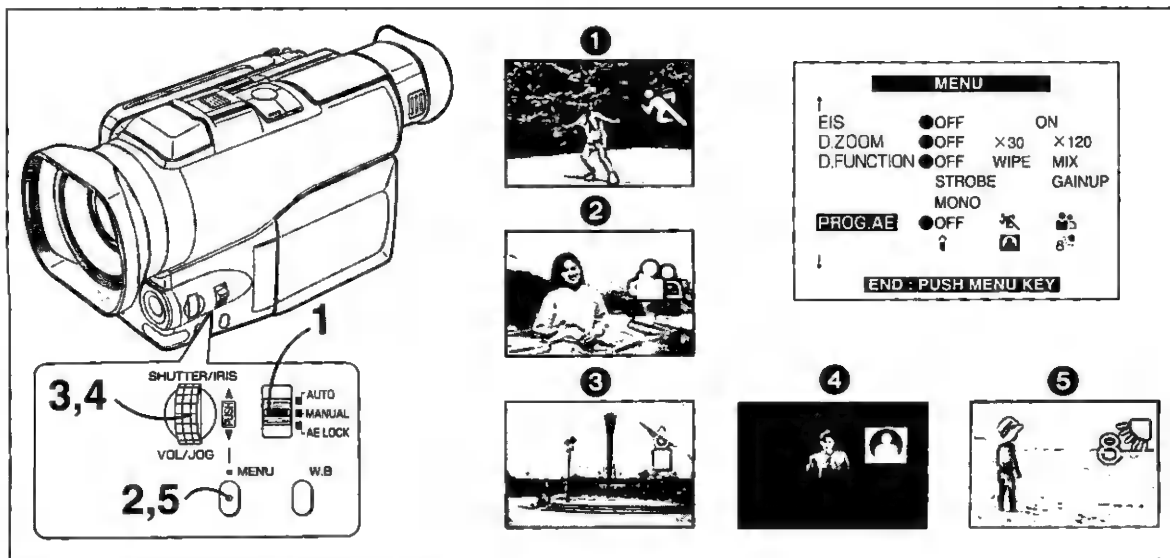
Fading-in lets you make the picture and sound appear gradually from a white screen at the beginning of a scene.

- 1 With the Movie Camera in the Recording Pause Mode, keep the Fade Button [■] pressed.**
The picture gradually disappears.
- 2 When the picture has completely disappeared, press the Start/Stop Button to start recording.**
- 3 Approximately 3 seconds after the recording has started, release the Fade Button [■].**
The picture gradually appears again.

Fading Out ②

Fading-out lets you make the picture and sound disappear gradually into a white screen at the end of a scene.

- 1 During recording, keep the Fade Button [■] pressed.**
The picture gradually disappears.
- 2 After the picture has completely disappeared, press the Start/Stop Button to stop recording.**
The Movie Camera is in the Recording Pause Mode.
- 3 Release the Fade Button [■].**



Recording In Various Situations (Program AE)

This function lets you select Automatic Exposure settings optimized for special recording situations.

1 Set the Mode Selector Switch to [MANUAL].
The [MNL] Indication appears.

2 Press the [MENU] Button.
The Menu appears.

3 Turn the [PUSH] Dial to select [PROG.AE].

4 Press the [PUSH] Dial to select the desired mode ([], [], [], [] or []).

If you have adjusted the shutter speed (→ 44) or the iris (→ 45), it is not possible to select Program AE Mode.

5 Press the [MENU] Button to exit the Menu.
The indication of the selected mode appears.

[] Sports Mode **①**

To record scenes with fast-moving subjects such as sports scenes.

[] Portrait Mode **②**

To make subjects stand out sharply from the background.

[] Low Light Mode **③**

To record dark scenes more brightly.

[] Spotlight Mode **④**

To record subjects under strong spotlights..

[] Surf & Snow Mode **⑤**

To record extremely bright scenes such as snow slopes and beaches.

Cancelling the Programme AE Function
Set [PROG.AE] on the Menu to [OFF].

Sports Mode

- ◆ When playing back scenes recorded in the Sports Mode, you can enjoy slow motion and still playback of very sharp images with fine details.
- ◆ Avoid recording under fluorescent, mercury-vapour or sodium lamps in this mode, as the color and the brightness of the playback picture might fluctuate.
- ◆ When recording subjects lit by strong lights or with much light reflection, the playback picture may contain vertical streaks of light.
- ◆ When the scene is not sufficiently lit, the [] Indication flashes.
- ◆ When using this mode for recording indoors, the playback picture may flicker.
- ◆ It is not possible to select the Sports Mode [] together with the Gain-up Mode [GAINUP] on the [MENU (D.FUNCTION)] Menu.

Portrait Mode

- ◆ When using this mode for recording indoors, the playback picture may flicker.
- ◆ It is not possible to select the Portrait Mode [] together with the Gain-up Mode [GAINUP] on the [MENU (D.FUNCTION)] Menu.

Low Light Mode

- ◆ It may not be possible to sufficiently brighten up extremely dark scenes.

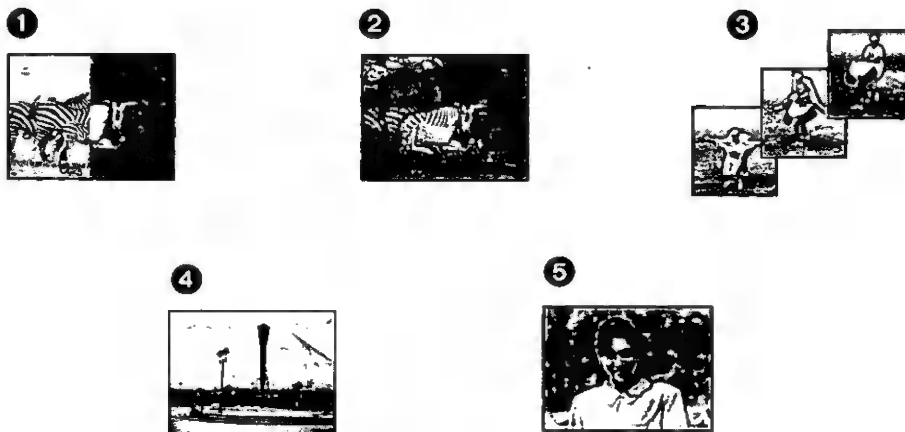
Spot Light Mode

- ◆ If the recorded subject is extremely bright the picture may appear whitish.

Surf&Snow Mode

- ◆ If the recorded subject is extremely bright, the picture may appear whitish.

- ◆ If you have adjusted the shutter speed (→ 44) or the iris (→ 45), it is not possible to select a Programme AE Mode ([] , [] [] [] or [])



Recording with Special Functions (Digital Functions)

There are 5 different modes available for adding special digital picture effects.

1 Wipe Mode [WIPE]

It gradually replaces a picture of the last recorded scene with the picture of the new scene, like drawing a curtain. For details, (→ 40).

2 Mix Mode [MIX]

It gradually fades out the picture of the last recorded scene while fading in the picture of the new scene. For details, (→ 41).

3 Strobe Mode [STROBE]

It records the pictures with a stroboscope-like effect.

4 Gain-up Mode [GAINUP]

It electronically brightens up the picture.

- In this mode, adjust the focus manually.

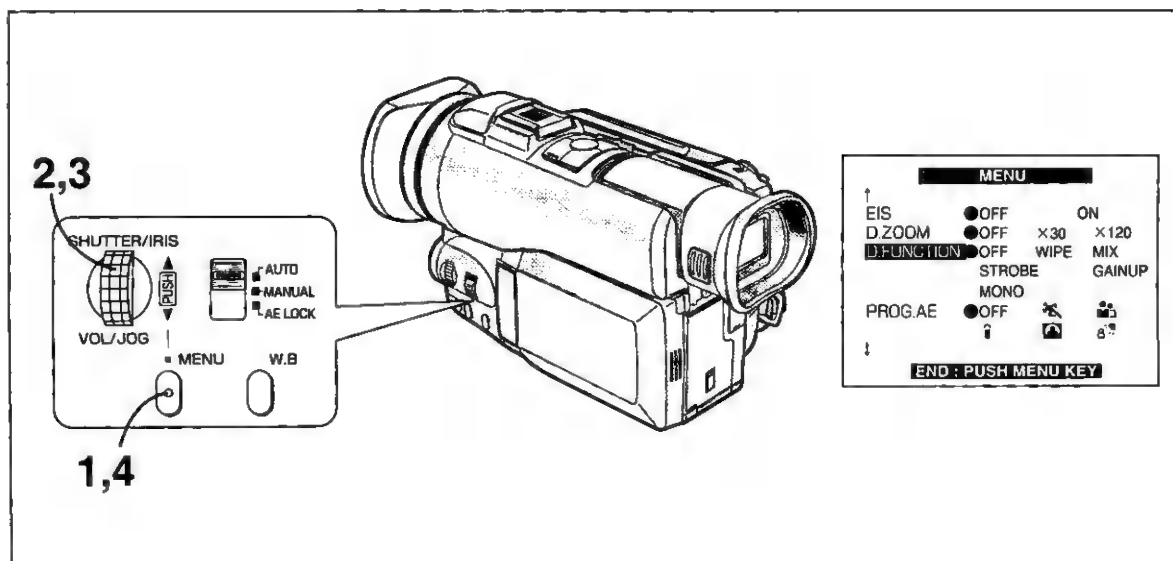
- ◆ Some after-image distortion may occur during recording with the Gain-up Function.

5 Monotone Mode [MONO]

The picture is recorded in black and white.

- ◆ The Digital Function cannot be used when the Electronic Image Stabilizer Function or the Digital Zoom Function is activated, or when [PICTURE] on the Menu is set to [FRAME].

When you want to use a digital function, make sure that [D.ZOOM] and [EIS] on the Menu are set to [OFF] and that [PICTURE] is set to [NORMAL].



Recording with Special Functions (Digital Functions) (Continued)

Selecting the Desired Digital Function

1 Press the [MENU] Button.

The Menu appears.

2 Turn the [PUSH] Dial to select [D.FUNCTION].



◆ The Digital Function cannot be used when the Electronic Image Stabilizer Function or the Digital Zoom Function is activated, or when [PICTURE] on the Menu is set to [FRAME].

When you want to use a digital function, make sure that [D.ZOOM] and [EIS] on the Menu are set to [OFF] and that [PICTURE] is set to [NORMAL].

3 Press the [PUSH] Dial to select the desired digital function.

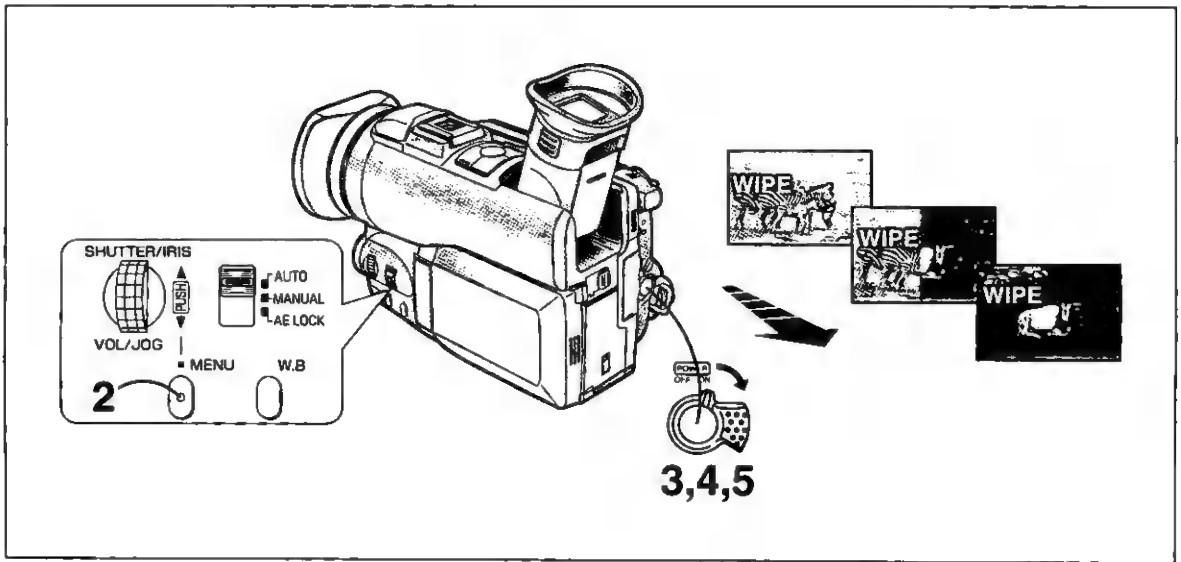
4 Press the [MENU] Button to exit the Menu.

- The picture has the selected digital function now. However, the effect of the Wipe Function and the Mix Function only become visible when actually recording in the respective mode. (→ 40, 41)

- ◆ If you have selected [GAINUP] on the [MENU (D.FUNCTION)] Menu, it is not possible to select the Manual White Balance Mode.
- ◆ If you have adjusted the shutter speed (→ 44) or the iris (→ 45), it is not possible to select [GAINUP] on the [MENU (D.FUNCTION)] Menu.
- ◆ It is not possible to select the Sports Mode [] or the Portrait Mode [] together with the Gain-up Mode [GAINUP] on the [MENU (D.FUNCTION)] Menu.

Cancelling the Digital Function

Set [D.FUNCTION] on the Menu to [OFF].



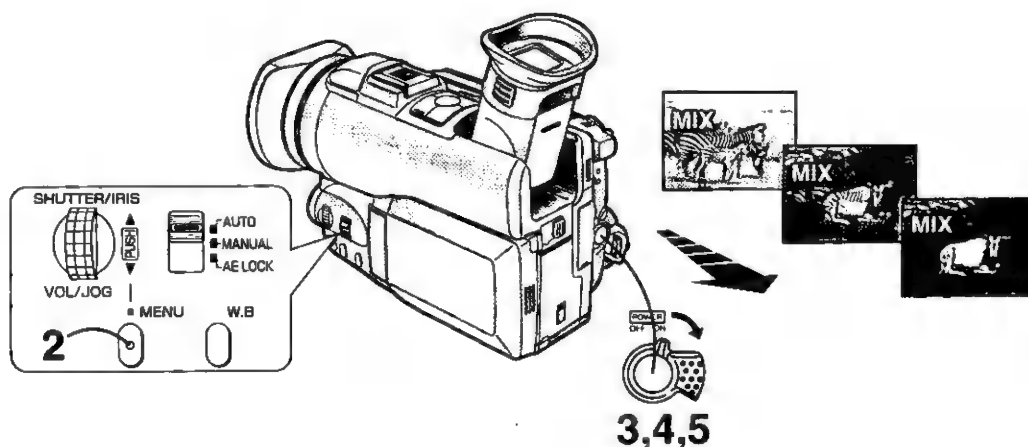
Recording with Special Functions (Digital Functions) (Continued)

■ Wipe Mode

It gradually replaces a still picture of the last recorded scene with the moving picture of the new scene, like drawing a curtain.

After performing steps 1-2 on page 39:

- 1** Select [WIPE] on the [MENU (D.FUNCTION)] Menu. (→ 39)
- 2** Press the [MENU] Button to exit the Menu.
The [WIPE] Indication appears.
- 3** Press the Start/Stop Button to start recording.
The normal recording starts.
- 4** Press the Start/Stop Button to pause recording.
The last picture is stored in memory.
- 5** Press the Start/Stop Button to start recording again.
The last picture of the previous scene is gradually replaced by the new scene.



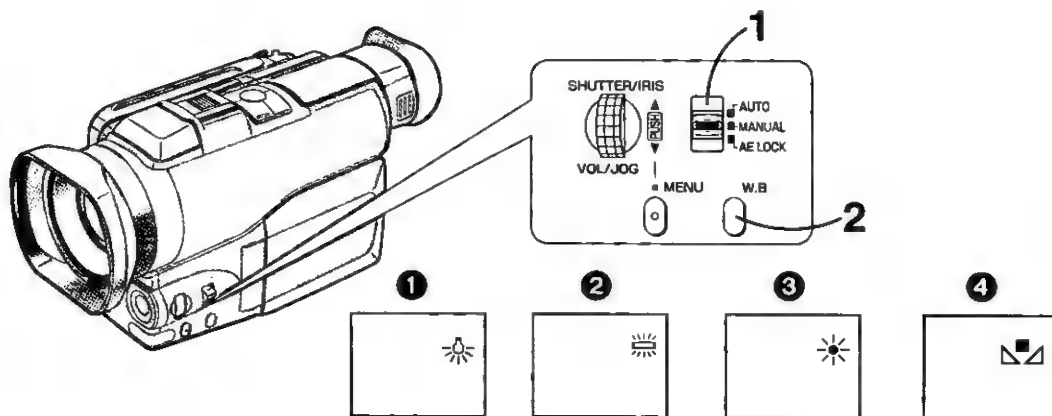
Recording with Special Functions (Digital functions) (Continued)

■ Mix Mode

It gradually fades out a still picture of the last recorded scene while fading in the moving picture of the new scene.

After performing steps 1-2 on page 39:

- 1** Select [MIX] on the [MENU (D.FUNCTION)] Menu. (→ 39)
- 2** Press the [MENU] Button to exit the Menu.
The [MIX] Indication appears.
- 3** Press the Start/Stop Button to start recording.
The normal recording starts.
- 4** Press the Start/Stop Button to pause recording.
The last picture is stored in memory.
- 5** Press the Start/Stop Button to start recording again.
The last picture gradually fades out while the new scene fades in.



Recording with Natural Colors (White Balance)

This Movie Camera automatically adjusts the white balance to ensure that the pictures are recorded with natural colors. For certain types of subjects and lighting conditions, however, this Auto White Balance Adjustment Mode may not be able to ensure natural colors (→ 74, 75). In these cases, adjust the white balance manually.

1 Set the Mode Selector Switch to [MANUAL].

The [MNL] Indication appears.

2 Press the [W.B] Button.

Repeatedly press the [W.B] Button to select the desired White Balance Mode.

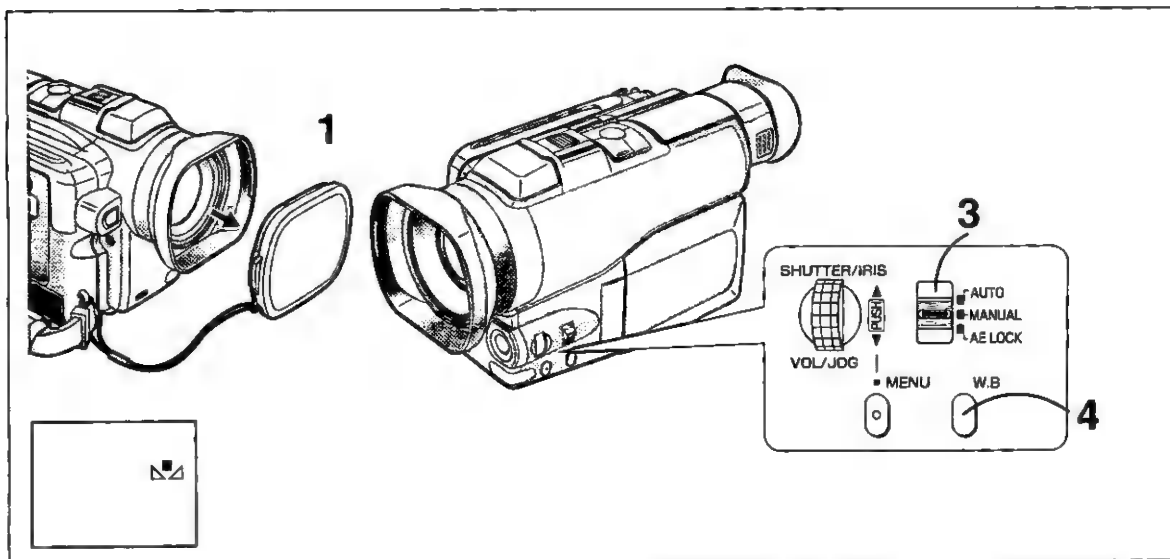
The modes change in the following order:

- ① Indoor (Incandescent Lamp) Mode (☀)
- ② Indoor fluorescent lamp (☀)
- ③ Outdoor Mode (☀)
- ④ Lock Mode (☐)

◆ If you select [GAINUP] on the [MENU (D.FUNCTION)] Menu, you cannot select or change the White Balance Mode.

Returning to the Auto White Balance Adjustment Mode

Set the Mode Selector Switch to [AUTO].



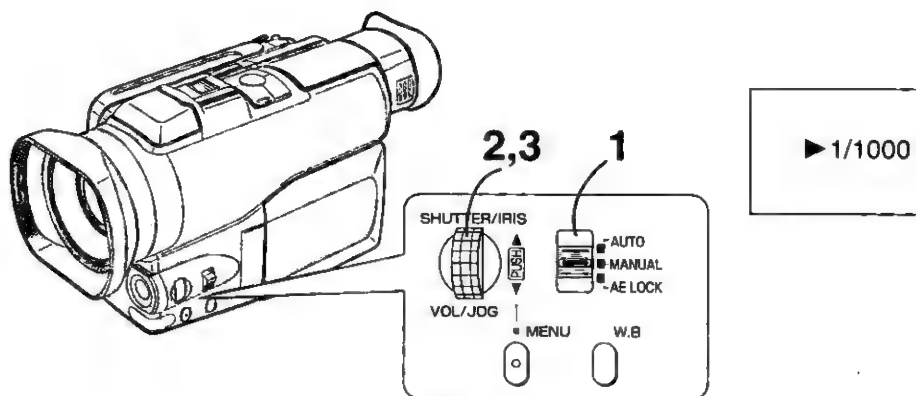
Adjusting the White Balance Manually

Use the Manual White Balance Adjustment Mode for all types of lighting outside the range ① (→ 75), as the Auto White Balance Adjustment Mode can only ensure natural colors for the types of lighting within that range. For optimum results under almost any types of lighting, we recommend that you adjust the white balance manually for each new scene.

- 1 Remove the Lens Cap.**
- 2 Point the Movie Camera at white paper or at another white object.**
- 3 Set the Mode Selector Switch to [MANUAL].**
The [MNL] Indication appears.
- 4 Keep the [W.B] Button pressed until the [WB] Indication stops flashing and remains lit.**
 - The Manual White Balance Adjustment is now finished. If you want to use this setting again later on, for example after having used Automatic White Balance Adjustment, you can recall it by pressing the [W.B] Button 4 times. (In this case, the [WB] Indication flashes.)
 - ◆ When the [WB] Indication remains flashing under weak illumination, the Manual White Balance Adjustment cannot be set manually.

Returning to the Auto White Balance Adjustment Mode

Set the Mode Selector Switch to [AUTO].



Adjusting the Shutter Speed Manually

To achieve special creative effects or to cope with special lighting situations or fast-action scenes, you can adjust the shutter manually.

1 Set the Mode Selector Switch to [MANUAL].

The [MNL] Indication appears.

2 Press the [PUSH] Dial.

If you have adjusted the shutter speed, it is not possible to select a Programme AE Mode ([P], [A], [S], [M] or [B]) or the Gain-up Mode [GAINUP] on the [MENU (D.FUNCTION)] Menu.

3 Turn the [PUSH] Dial to adjust the shutter speed.

Range of Shutter Speed Adjustment

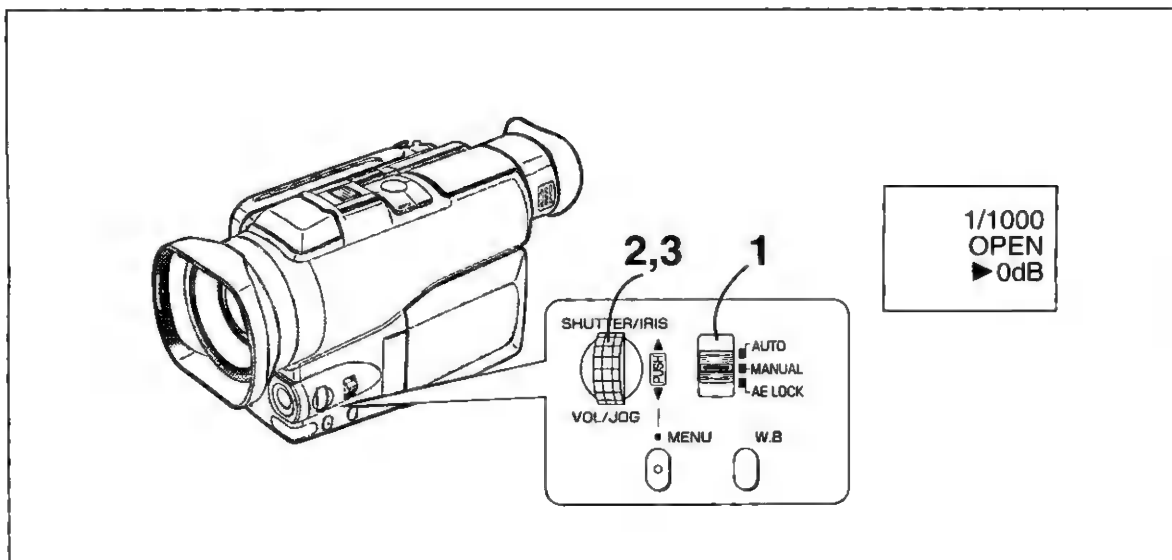
1/60 – 1/8000 ■

The standard shutter speed is 1/60 s.

The nearer to [1/8000] a setting you select, the faster the shutter speed becomes.

Returning to the Normal Shutter Speed

Set the Mode Selector Switch to [AUTO].



Adjusting the Iris (F Number) Manually

To achieve special creative effects or to cope with special lighting situations or fast-action scenes, you can adjust the iris (F number) manually.

1 Set the Mode Selector Switch to [MANUAL].

The [MNL] Indication appears.

2 Press the [PUSH] Dial twice.

The [►F] Indication appears.

3 Turn the [PUSH] Dial to adjust the iris.

Range of Iris Adjustment

CLOSE (Closed) → F16.0...F1.7 → OPEN (Opened)
+0dB...+12dB

The nearer to [CLOSE] a value you select, the darker the picture becomes.

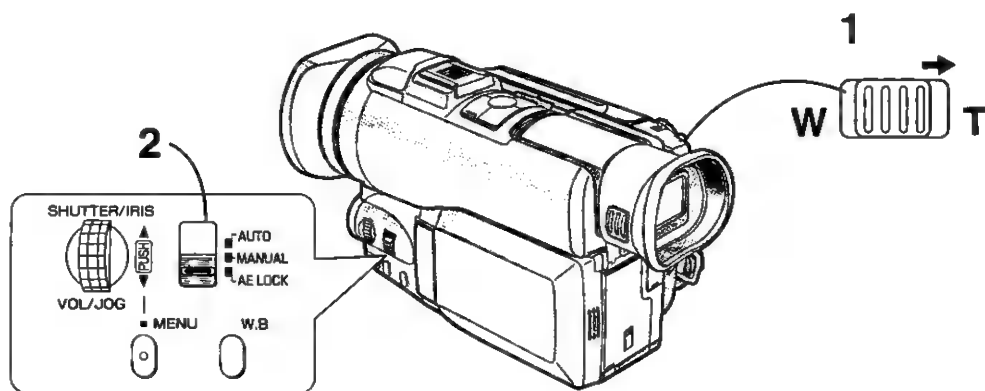
The nearer to [OPEN] a value you select, the brighter the picture becomes.

The figures with +dB show the Gain-up value. If you increase the value too much, the picture quality deteriorates.

Returning to the Normal Iris Value (F Number)

Set the Mode Selector Switch to [AUTO].

- ◆ Manually adjusting the shutter speed (→ 44) after performing manual iris adjustment changes the iris back to automatic adjustment.
Therefore, if you want to adjust both the shutter speed and iris manually, be sure to adjust the shutter speed first.
- ◆ If you have adjusted the iris, it is not possible to select a Programme AE Mode ([], [], [], [] or []) or the Gain-up Mode [GAINUP] on the [MENU (D.FUNCTION)] Menu.



Recording with Fixed Brightness (AE Lock)

The AE Lock Function lets you record a subject with the same brightness even when the lighting conditions change greatly. For example, when you record a person who moves from a bright to a dark place, or vice versa, this function prevents the person's face from becoming brighter or darker.

1 Push the [W/T] Zoom Lever toward [T] to zoom in on the subject.

2 Set the Mode Selector Switch to [AE LOCK].

The [AE LOCK] Indication appears.

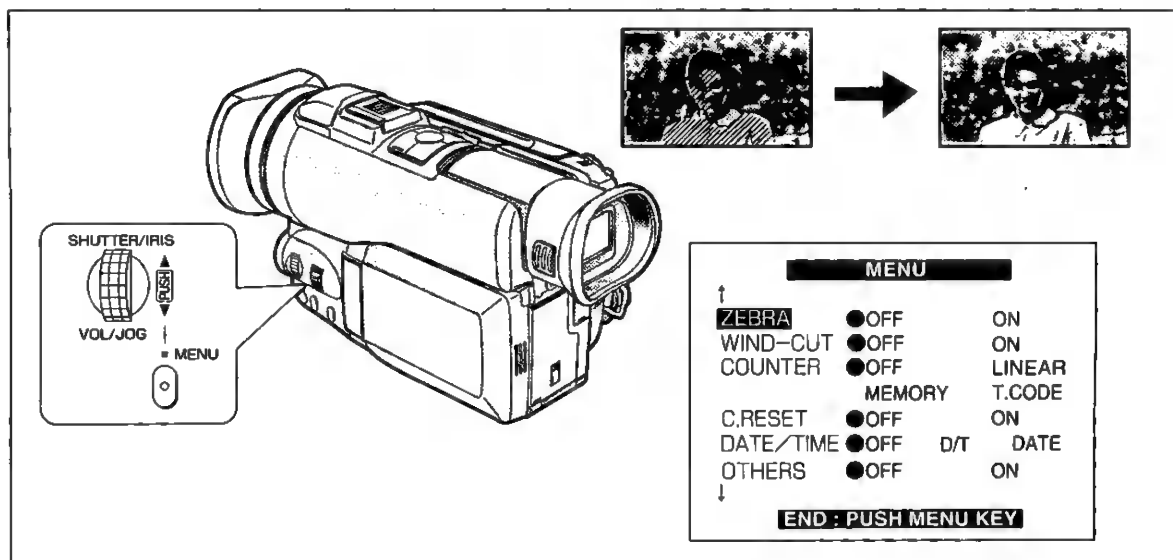
The brightness of the picture is now locked to the value it had at the moment of setting the switch to [AE LOCK].

Cancelling the AE Lock Function

Set the Mode Selector Switch to [AUTO] or [MANUAL].

Locking the Brightness at a Desired Level

After Step 1 above, set the Mode Selector Switch to [MANUAL] to adjust the brightness manually (→ 44, 45) and then set the Mode Selector Switch to [AE LOCK].



Other Convenient Functions

Zebra Pattern

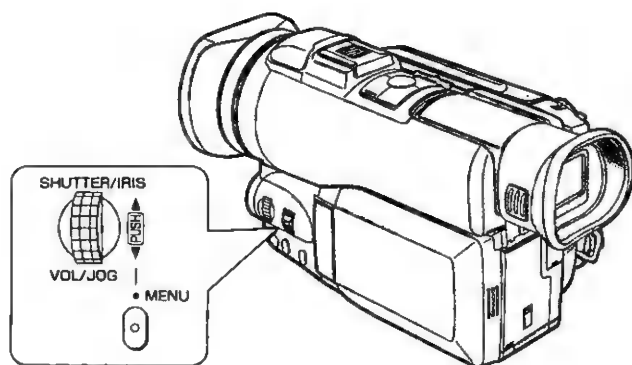
Using the Zebra Pattern makes it easy to adjust the brightness of the picture to an optimum level, even before you start recording.

If you set [ZEBRA] on the Menu to [ON], diagonal white bands (Zebra Pattern) appear on the LCD Monitor or in the Finder on parts of the picture which are overexposed (extremely brightly lit and shiny subjects).

To prevent recording of overexposed, whitish pictures, manually adjust the shutter speed (→ 44) and/or iris/gain (→ 45) so that the Zebra Pattern disappears.

However, when recording a person wearing a white shirt, adjust so that the Zebra Pattern over the face just disappears but remains distinctly over the white shirt. If it disappears over the white shirt, the picture becomes too dark.

Of course, the Zebra Pattern is not recorded onto the tape.



MENU		
↑		
WIDE	●OFF	ON
SHUTTER	●OFF	ON
REC-SPEED	●SP	LP
PICTURE	●NORMAL	FRAME
AUDIO-REC	●12bit	16bit
MIC LEVEL	-20dB -10dB 0dB	
	+3dB +6dB ●AUTO	
↓		
END : PUSH MENU KEY		

Other Convenient Functions

(Continued)

Picture Mode

If you set [PICTURE] on the Menu to [FRAME] for recording (→ 62, 63), the still picture can be played back with increased clarity.

NORMAL: Select this mode for normal recording.

FRAME: As the pictures are recorded as frames, their vertical resolution is 50% higher than in normal recording.

However, fast movements in the picture become somewhat jerky.

Use this mode for recording still pictures that you want to print or import into computer applications.

◆ If you set [PICTURE] to [FRAME], it is not possible to use a digital function. (→ 38)

Microphone Sensitivity Level

You can adjust the microphone sensitivity for recording and audio dubbing by selecting a desired setting for [MIC LEVEL] on the Menu (→ 63)

AUTO: To record with automatically adjusted optimum level.

-20dB: To record with reduced volume.

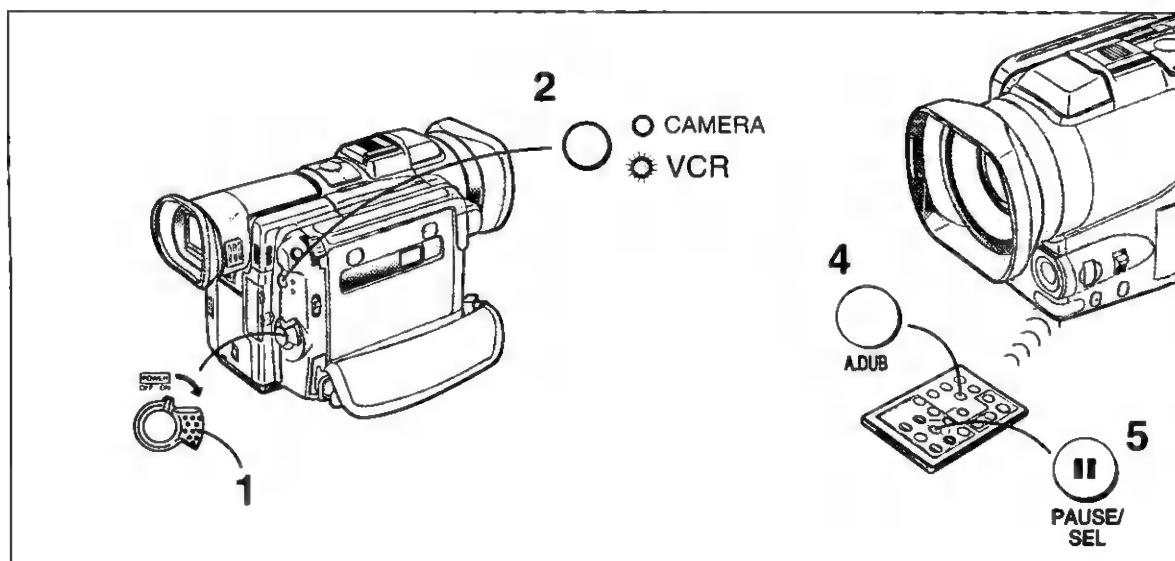
-10dB: To record with slightly reduced volume.

0dB: To record the sound with default sensitivity. Loud sounds may become distorted.

+3dB: To record with slightly increased volume.

+6dB: To record with increased volume.

• When you set [MIC LEVEL] to any other setting than [AUTO], the Microphone Sensitivity Level Indication, for example [MIC +6dB], may be displayed in red to warn that the sound being recorded is distorted. In this case, select a lower setting for [MIC LEVEL] or set [MIC LEVEL] to [AUTO].



Adding New Sound on a Recorded Cassette

(Audio Dubbing)

To perform audio dubbing, the Remote Controller is necessary.

You can add music or narration on a recorded cassette.

- ◆ If [AUDIO REC] on the Menu has been set to [16bit], performing audio dubbing will completely erase the previously recorded sound.

Therefore, if you intend to perform audio dubbing but also want to keep the original sound, be sure to set [AUDIO REC] on the Menu to [12bit] before making the original recording.

- ◆ It is not possible to perform audio dubbing onto recordings made in the LP Mode. (→14)

- 1 Insert the recorded cassette and set the [POWER ON/OFF] Switch to [ON].
- 2 Press the [VCR/CAMERA] Button so that the [VCR] Lamp lights.
- 3 At the point from which you want to insert the new sound, switch the Movie Camera over to the Still Playback Mode.
- 4 Press the [A.DUB] Button on the Remote Controller.
- 5 Press the Pause Button [II] on the Remote Controller to start audio dubbing.

Stopping Audio Dubbing

Press the Pause Button [II] on the Remote Controller.

The Movie Camera is again in the Still Playback Mode.

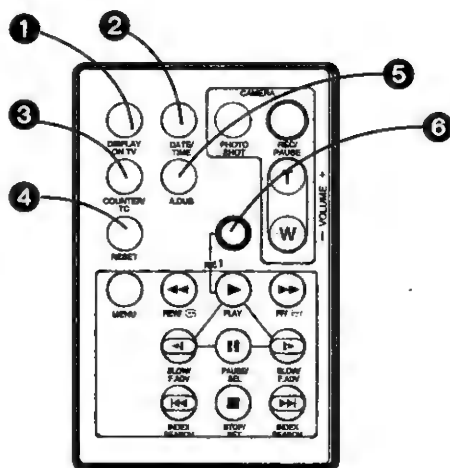
Playing Back the Sound Recorded with Audio Dubbing

- ◆ If you set [AUDIO REC] on the Menu to [12bit] for the original recording, the sound added with audio dubbing and the original sound are played back as follows depending on the setting selected for [AUDIO] on the VCR Mode Menu (→ 62,65):

ST1: The original sound alone is played back.
ST2: The dubbed sound alone is played back.
MIX: The original sound and the sound added with audio dubbing are played back together.

- ◆ Do not perform audio dubbing onto unrecorded parts of the tape. This could cause the playback picture and sound to be distorted.

- If you reset the Tape Counter to zero at the point where you want the audio dubbing to end and turn on the Memory Stop Function (→76), the audio dubbing automatically stops when the tape reaches that point.



Remote Controller

Using the wireless Remote Controller supplied with the Movie Camera allows operating most of the Movie Camera's major functions from a distance.

Buttons on the Remote Controller

1 Indication Output Button [DISPLAY ON TV]

(→ 29)

To display the function and operation indications on a connected TV.

2 Date and Time Button [DATE/TIME]

(→ 25)

To make the Date/Time Indication appear or disappear in the picture during recording and playback.

3 Indication Shift Button [COUNTER/TC]

(→ 80)

To select the desired Counter Indication.

4 Reset Button [RESET] (→ 76)

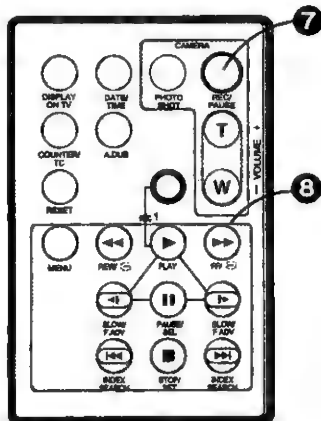
To reset the Tape Counter to zero.

5 Audio Dubbing Button [A.DUB] (→ 49)

To perform audio dubbing.

6 Recording Button [REC] (→ 57)

To dub digital signals input into the Movie Camera via the DV Input/Output Terminal, press the [REC] Button and the [PLAY] Button together.



7 Controls for Recording and Sound Volume

Photoshot Button [PHOTO SHOT]

(→ 22)

To record still pictures.

Recording Start/Stop Button

[REC/PAUSE] (→ 17)

To start and pause recording.

Zoom/Sound Volume Buttons

[ZOOM/VOLUME]

To zoom in and out. (→ 21)

To adjust the volume of the playback sound. (→ 25)

8 Controls for Playback/Menu Setting

Rewind/Review Button [◀◀]

To start review playback (→ 26) if pressed during normal playback; and to rewind the tape if pressed in the Stop Mode.

Also to activate the Camera Search Function (→ 31) in reverse direction if kept pressed in the Recording Pause Mode. Pressing it briefly activates the Recording Check Function (→ 18).

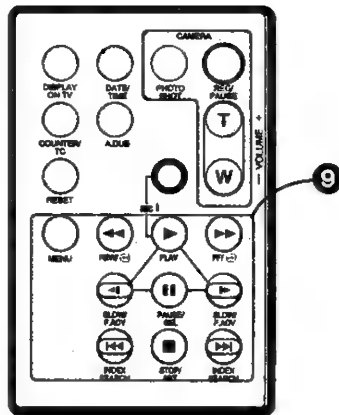
Fast-forward/Cue Button [▶▶]

To start cue playback (→ 26) if pressed during normal playback; and to fast-forward the tape if pressed in the Stop Mode.

Also to activate the Camera Search Function (→ 31) in forward direction if kept pressed in the Recording Pause Mode.

Play Button [▶] (→ 25)

To start playback.



9 Slow Motion/Frame Advance Button [◀I, I▶] (→ 27, 28)

To perform Slow Motion Playback if pressed in the Normal Playback Mode; and to perform Frame Advance Playback if pressed in the Still Playback Mode.

(◀I in reverse direction, I▶: in forward direction)

Index Search Button [◀◀◀, ▶▶▶] (→ 34, 35)

To search for recorded scenes marked with an index signal and for still images recorded in the Photoshot Mode.

(◀◀◀: in reverse direction, ▶▶▶: in forward direction)

Stop/Set Button [■] (→ 25)

To stop the tape.

Pause/Select Button [II] (→ 28)

To pause playback. The playback picture stands still.

Using the Menu Button [MENU]

Pressing the Menu Button [MENU] displays the Menu. In this case, the functions of the following buttons are changed:

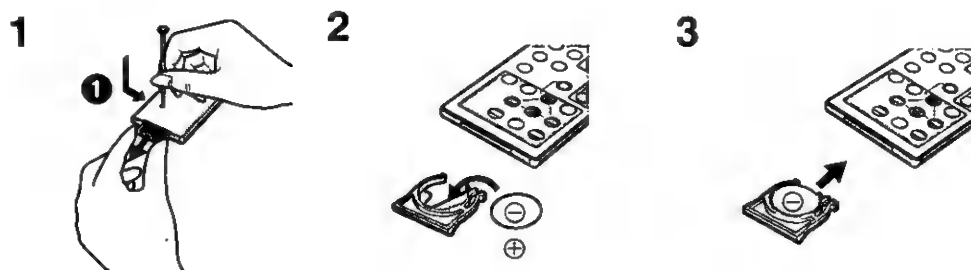
Pause Button → Select Button

To select items on the Menu.

Stop Button → Set Button

To set the mode for the selected item.

- ◆ The iris and the shutter speed cannot be adjusted with the Remote Controller. If you want to adjust them manually, use the [PUSH] Dial on the Movie Camera.
(→ 44, 45)



Remote Controller (Continued)

■ Replacing the Button-type Battery

When the button-type battery is exhausted, replace it with a new CR2025 battery.

(The life of the battery is about 1 year. However, it depends on the frequency of use.)

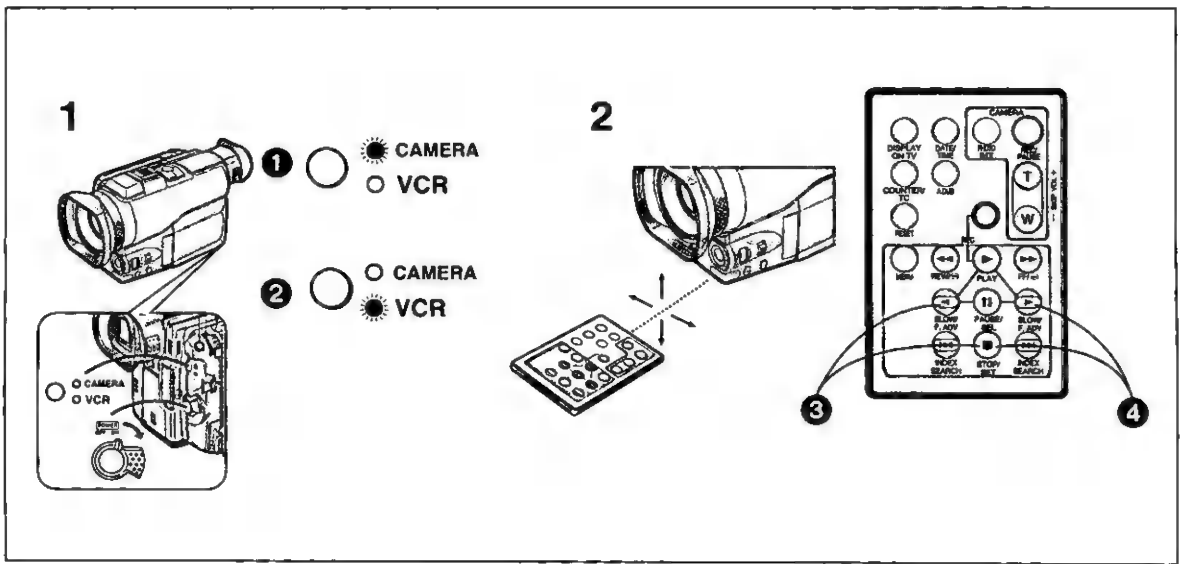
1 Pull out the Battery Holder while sliding the Stopper with a pointed object in the direction of the arrow ①.

2 After taking out the old Battery, insert the new button-type battery with the stamped (+) mark facing downward.

3 Insert the Battery Holder into the Remote Controller.

- ◆ Keep the button-type battery out of the reach of children.
- ◆ Make sure you insert the battery with its poles correctly aligned.

Replace battery with Panasonic PART NO. VSBW0004 (CR2025) only. Use of another battery may present a risk of fire or explosion. Caution-battery may explode if mistreated. Dispose of used battery promptly. Keep away from children. Do not recharge, disassemble or dispose of in fire.



■ Using the Remote Controller

1 Set the [POWER ON/OFF] Switch on the Movie Camera to [ON].

- When the [CAMERA] Lamp lights, you can use the recording functions. ①
- If you want to use the playback functions, press the [VCR/CAMERA] Button so that the [VCR] Lamp lights. ②

2 Aim the Remote Controller at the Remote Control Sensor on the Movie Camera and press the appropriate button.

Distance to the Movie Camera: Less than 5 metres.
Angle: Approximately 15° up, down, left and right from center axis.

- ◆ The operative range described above is valid for using the Remote Controller indoors.

When using it outdoors or under strong lights, it may not work correctly even within the above range.

- Within a distance of about 1 metre, it is also possible to use the Remote Controller from the side (LCD Monitor side).

Selecting the Remote Controller Mode

When using two Movie Cameras at the same time, selecting different Remote Controller Modes makes it possible to operate them separately.

- ◆ If the Remote Controller Mode set on the Movie Camera and on its Remote Controller are not matched, the [REMOTE] Indication appears.

- ◆ Replacing the button-type battery in the Remote Controller may reset it to the [VCR1] Mode.

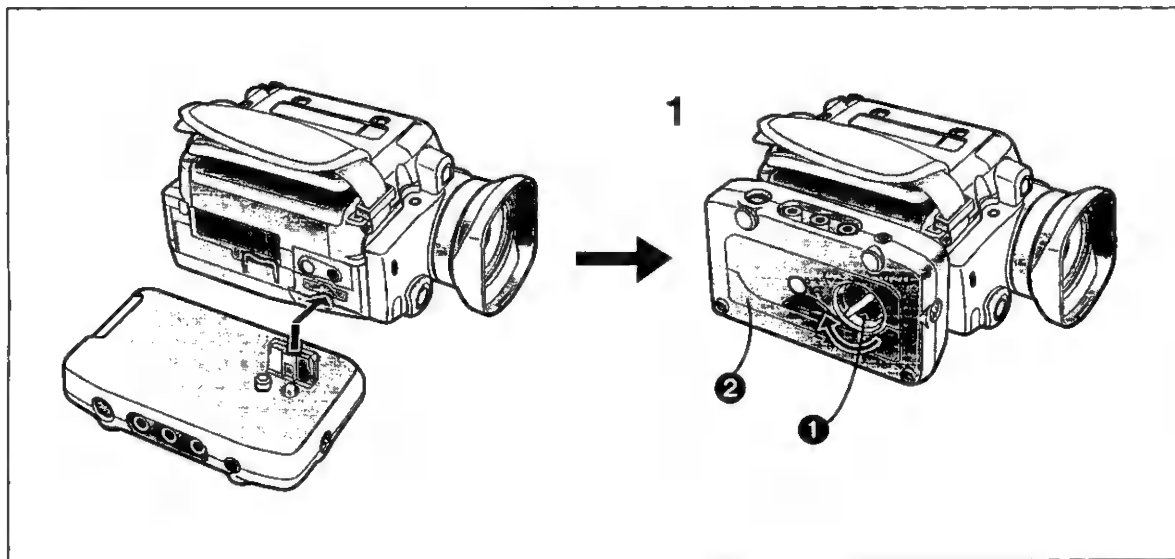
- Set [REMOTE] on the Menu to the desired Remote Controller Mode. (→ 62-64)

③ Press the [←] Button and the [■] Button simultaneously.

This selects the [VCR2] Mode.

④ Press the [→] Button and the [■] Button simultaneously.

This selects the [VCR1] Mode.



Copying onto an S-VHS (or VHS)

Cassette

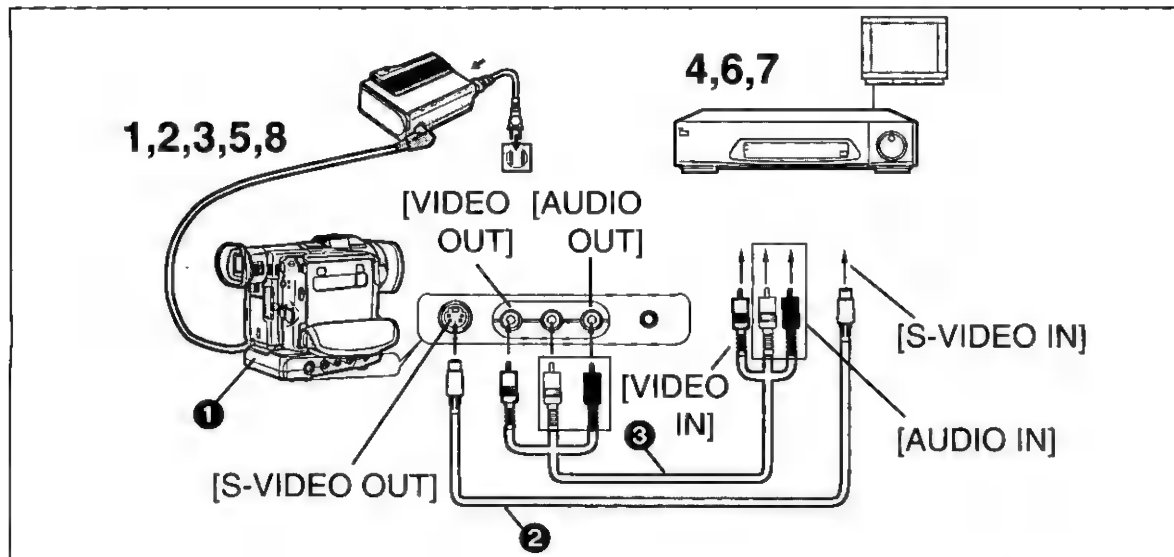
(Dubbing)

If you attach the Docking Station, you can copy cassettes recorded with this Movie Camera onto S-VHS or VHS cassettes.

Attaching the Docking Station

1 Insert the plug of the Docking Station into the underside of the Movie Camera and lock it with the Screw **1**.

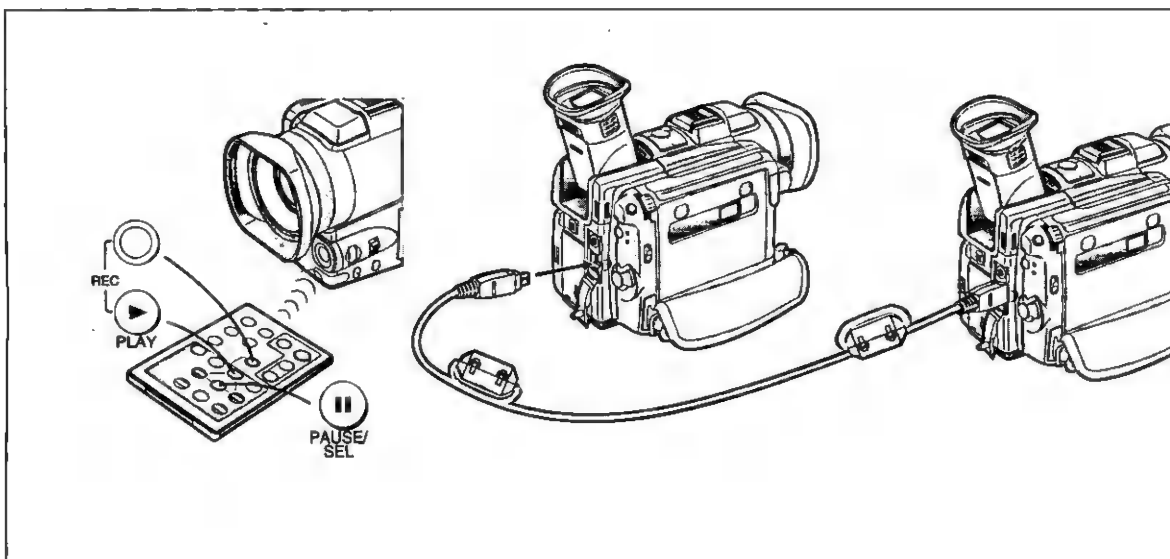
- Before copying, press the [DISPLAY ON TV] Button on the Remote Controller (→ 29) so that no indications appear. Otherwise, the Counter Indication and function indications are also recorded onto the cassette.
- Extending the Support Leg **2** from the underside of the Docking Station makes it easier to view the playback picture on the LCD Monitor.



After connecting all equipment as shown above, perform the following operations:

- 1 Movie Camera:**
Set the [POWER ON/OFF] Switch to [ON].
- 2 Movie Camera:**
Insert the recorded cassette.
- 3 Movie Camera:**
Press the [VCR/CAMERA] Button so that the [VCR] Lamp lights.
- 4 VCR:**
Insert an unrecorded cassette with intact erasure prevention tab.
As some settings (external input, tape speed, etc.) on the VCR are necessary, please refer to your VCR's operating instructions.
- 5 Movie Camera:**
Press the Play Button [▶] to start playback.
- 6 VCR:**
Start recording.
- 7 VCR:**
Press the Pause or Stop Button to stop recording.
- 8 Movie Camera:**
Press the Stop Button [■] to stop playback.

- ① Docking Station
- ② S-Video Cable
- ③ AV Cable



Using with Digital Video Equipment (Recording)

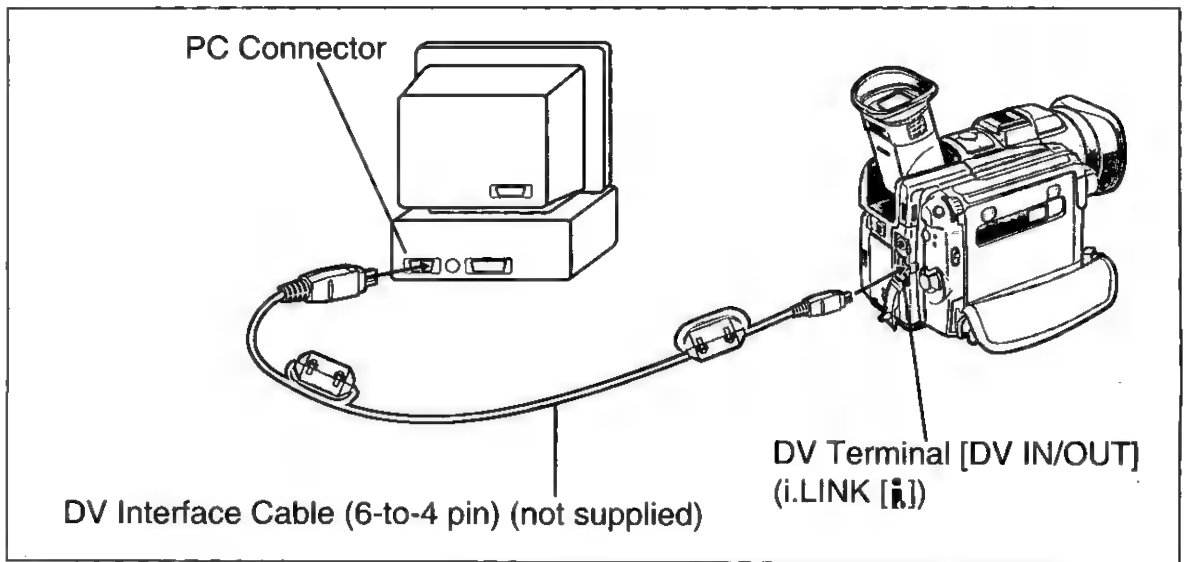
If you connect this Movie Camera with other Digital Video equipment (for example another Movie Camera of the same type) equipped with DV Input/Output Terminal (IEEE1394) using the DV Cable (Optional), you can dub high-quality picture and sound in the digital format.

- 1 [Playback Unit]**
Insert the recorded cassette and press the [VCR/CAMERA] Button so that the [VCR] Lamp lights.
- 2 [Recording Unit]**
Insert a cassette onto which you want to perform dubbing and press the [VCR/CAMERA] Button so that the [VCR] Lamp lights.
- 3 [Playback Unit]**
Press the Playback Button [▶] to start playback.
- 4 [Recording Unit]**
While pressing the [REC] Button, press the [PLAY] Button (both on the Remote Controller).
Recording starts.

Stopping Recording

Press the Pause Button [⏸] or the Stop Button [■] to stop recording.

- Regardless of the setting for [AUDIO-REC] on the Menu of the recording unit, dubbing is performed in the same audio recording mode as that of the cassette in the playback unit.
- The lower part of the picture may be distorted.
However, this is not a malfunction and does not affect the actual recording.
- If you start dubbing without connecting the DV Cable, an Error Message appears, and a random picture may be recorded for a short moment.
- If the playback unit plays back an unrecorded part of the tape, a random picture is recorded.



PC Connection

A live image can be transferred directly to your PC (Personal Computer) via a DV Interface Cable (not supplied) using products from Adaptec, Digital Origin or Canopus.

Using these products allows you to capture live images onto your PC, edit the captured image, etc.

Note

For more detailed information,
please see the Adaptec, Digital Origin and
Canopus brochures in this box or visit their
web site at:

<http://www.adaptec.com/1394>

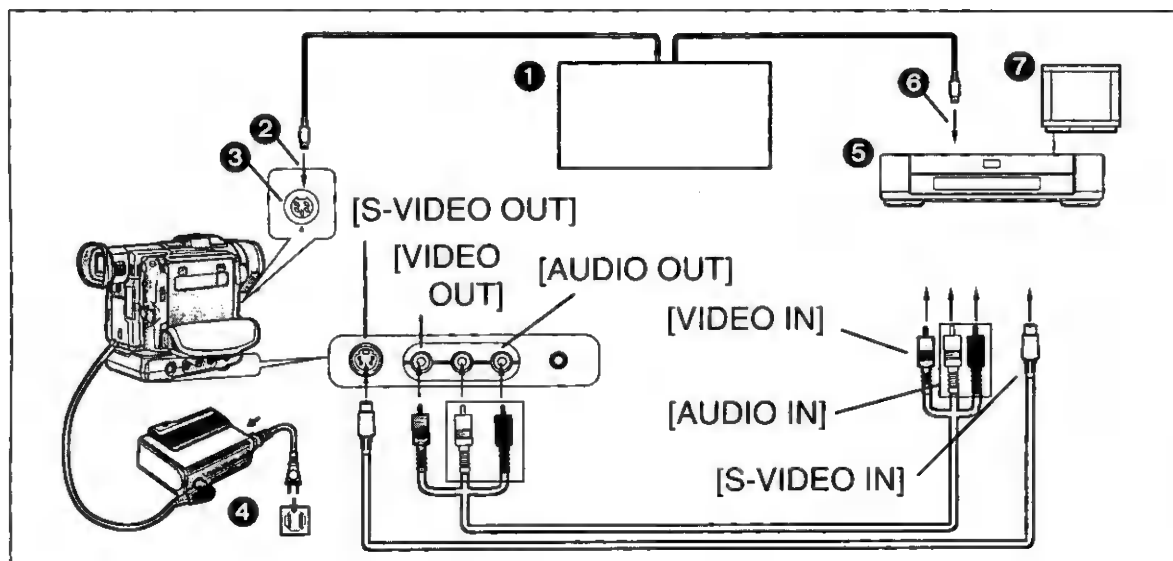
<http://www.digitalorigin.com/DVP>

<http://www.justedit.com>

For assistance on Adaptec products,
call 1-800-442-7274

For assistance on Digital Origin products,
call 1-800-572-3487

For assistance on Canopus products,
call 1-888-868-2533



Copying with the Help of an Editing Controller

If you connect the Movie Camera to an Editing Controller ① equipped with 5-pin Edit Jack, this Movie Camera's playback functions can be controlled from the Editing Controller.

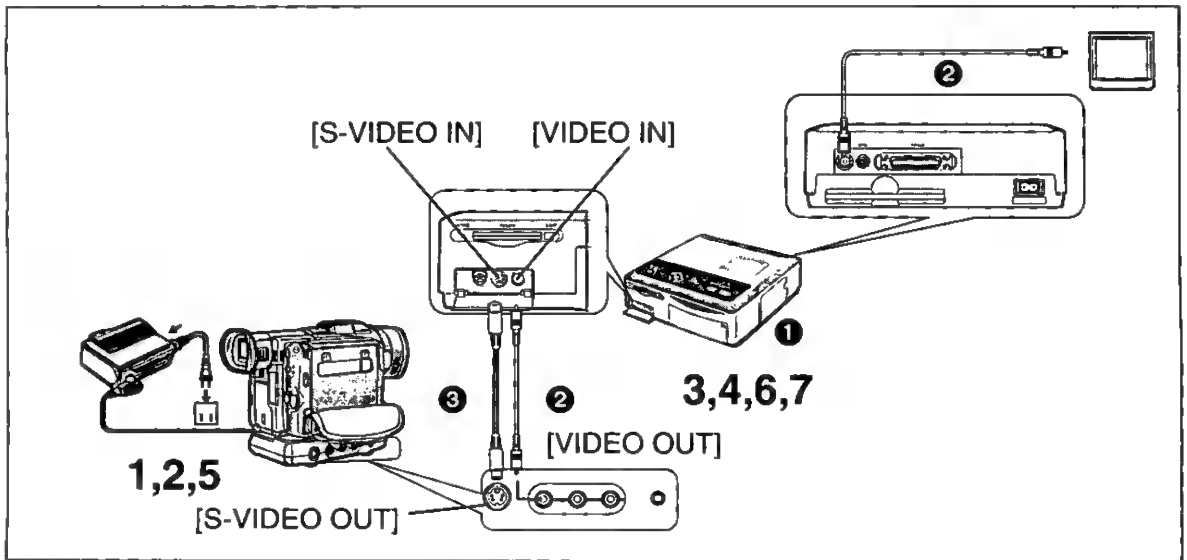
(The Docking Station is necessary.)

When Editing with Time Code

Press the [COUNTER/TC] Button on the Remote Controller to make the Time Code appear.

- When the Time Code is displayed, the Time Code Signal is output from the Edit Jack.
- When the Counter Indication is displayed, the Linear Tape Counter Signal is output.

- ② To Edit Jack
- ③ Edit Jack
- ④ Connect the AC Adaptor
- ⑤ VCR (optional)
- ⑥ To Edit Jack
- ⑦ TV (optional)



Using the Movie Camera with a Video Printer

If you connect the Movie Camera to a Video Printer, you can print still pictures from scenes recorded with the Movie Camera.

Movie Camera:

- 1** Set the [POWER ON/OFF] Switch to [ON] to turn the Movie Camera on.
- 2** Insert a recorded cassette and press the [VCR/CAMERA] Button so that the [VCR] Lamp lights.
- 5** Press the Play Button [▶].

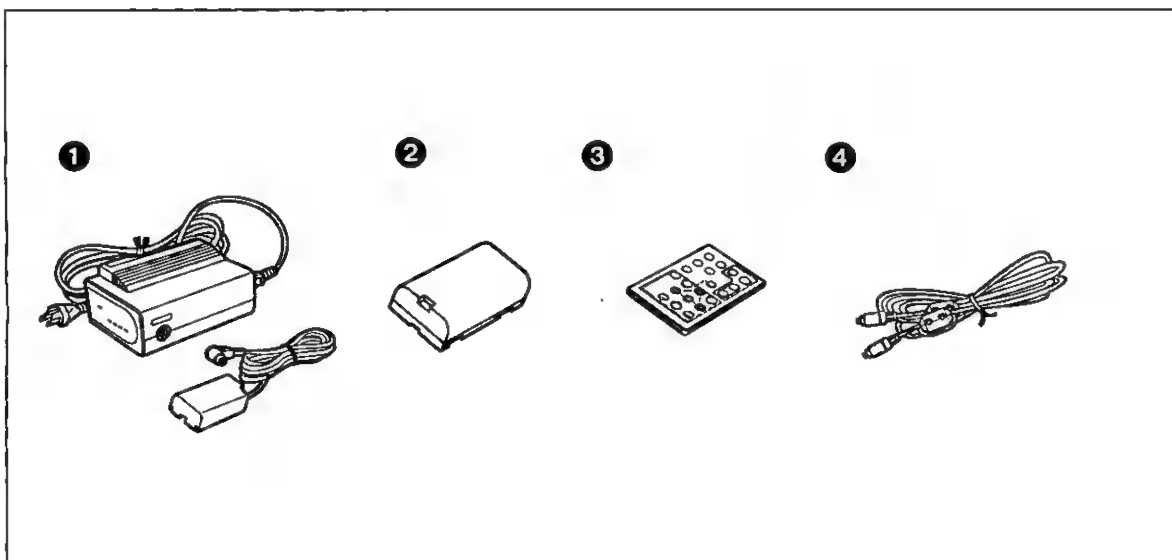
Video Printer:

- 3** Turn the Video Printer on.
- 4** If the Video Printer is equipped with Electronic Image Stabilizer Function and/or Moving/Still Picture Mode, adjust them according to the picture being input.
- 6** Store the image in memory.
- 7** Start printing.

• Read the operating instructions of the Video Printer ①.

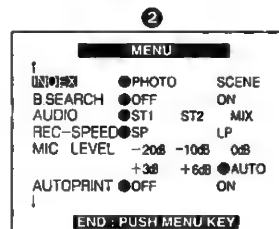
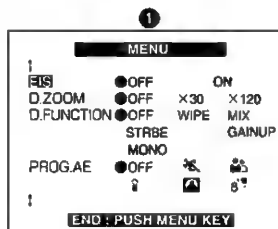
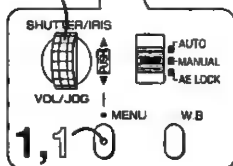
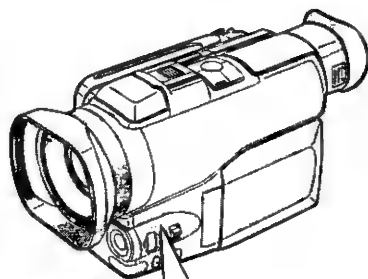
- ② Video Cable (supplied with the Video Printer)
- ③ S-Video Cables (not supplied)

For additional information about compatible video printers please contact Panasonic at 1-800-211-PANA (7262)



Optional Accessories

- ❶ AC Adaptor with AC cord and DC Power Cable (PV-DAC7)
- ❷ 1.25Ah lithium Ion Battery Pack (PV-DBP5)
- ❸ IR Remote Control (PV-DRC9)
- ❹ DV Interface Cable (PV-DDC9)



Using the Menu Screen

This Movie Camera displays the settings of various functions in Menus to make it easy to select the desired functions and settings.

1 Press the [MENU] Button.

The Menu appears.

2 Turn the [PUSH] Dial to select the item to be set.

Turning the [PUSH] Dial changes the highlighted item.

3 Press the [PUSH] Dial to set the selected item to the desired mode.

Every press moves the cursor [●] to the next mode.

Exiting the Menu

1 Press the [MENU] Button again.

Note About the Settings Made on the Menu

The settings you selected on the Menu are maintained when you turn the Movie Camera off. However, if you disconnect the power supply unit (Battery or AC Adaptor) from the Movie Camera before turning it off, the selected settings may not be maintained.

Displaying the Camera Mode Menu ①

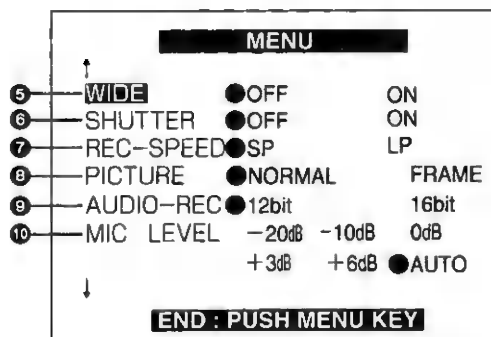
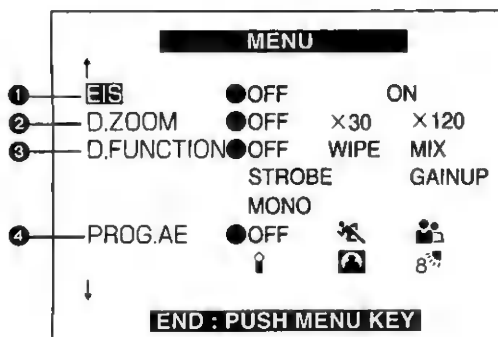
Press the [MENU] Button in the Recording Pause Mode.

- While the Menu is displayed, recording is not possible.
- During recording, displaying the Menu is not possible.

Displaying the VCR Mode Menu ②

Press the [MENU] Button when the [VCR] Lamp is lit.

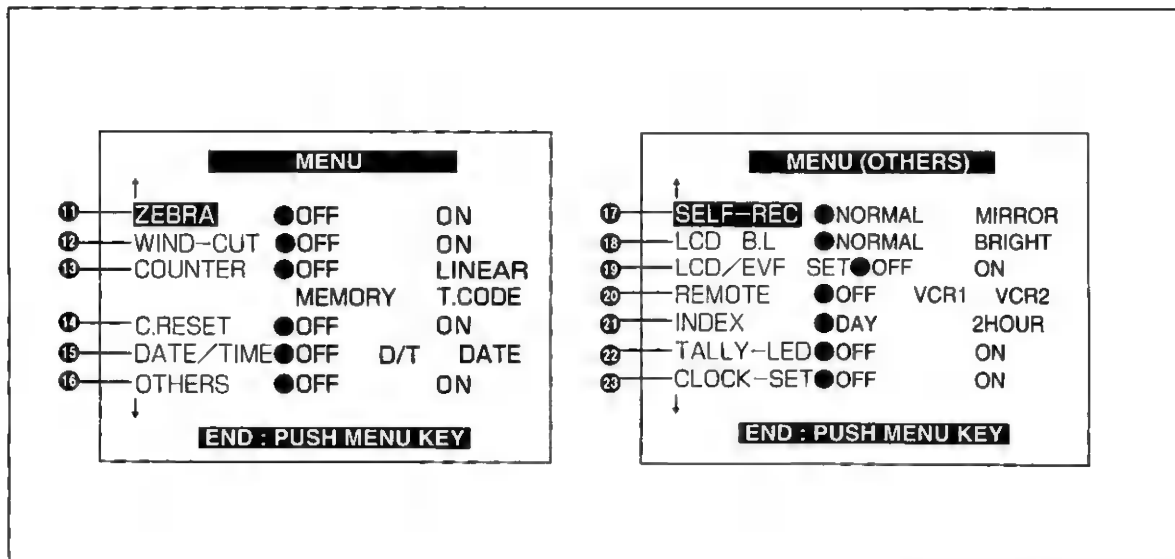
- While the Menu is displayed, playback is not possible.
- During playback, displaying the Menu is possible.



Menu Functions

Camera Mode Menu

- 1 Electronic Image Stabilizer [EIS] (→ 24)
- 2 Digital Zoom [D.ZOOM] (→ 21)
- 3 Digital Function[D.FUNCTION] (→ 39, 40, 41)
- 4 Auto Exposure Modes [PROG.AE] (→ 37)
- 5 Wide-Screen Format Recording [WIDE] (→ 23)
- 6 Shutter Effect [SHUTTER] (→ 22)
- 7 Recording Speed Mode [REC-SPEED] (→ 14)
- 8 Recording Mode [PICTURE] (→ 48)
- 9 Audio Recording Mode [AUDIO-REC] (→ 49)
- 10 Microphone Sensitivity level [MIC LEVEL] (→ 48)



11 Zebra Pattern [ZEBRA] (→ 47)

12 Wind Buffer [WIND-CUT]

If you set [WIND CUT] to [ON], the noise of the wind hitting the Microphone is reduced. However, this also causes a slight deterioration of the sound reproduction in the bass range.

13 Counter Display Mode [COUNTER] (→ 80)

14 Counter Reset [C.RESET] (→ 76)

To reset the counter to zero.
However, the Time Code cannot be reset.

15 Date and Time Indication [DATE/TIME] (→ 25)

16 Other Items[OTHERS]

If you set [OTHERS] to [ON], the [MENU(OTHERS)] Menu appears.

17 Self-Recording [SELF-REC] (→ 19)

18 LCD Lighting Mode [LCD B.L] (→ 68)

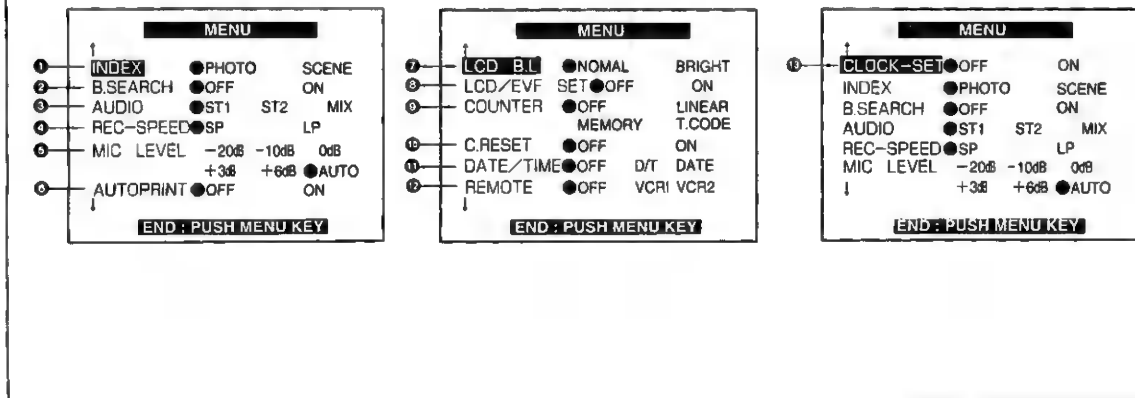
19 LCD and Finder Adjustment [LCD/EVF SET] (→ 68)

20 Remote Controller Mode [REMOTE] (→54)

21 Scene Index Mode [INDEX] (→33)

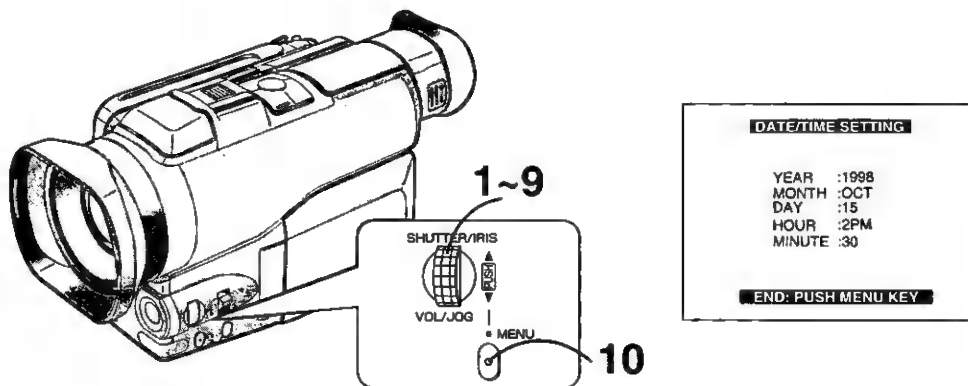
22 Tally-LED [TALLY-LED] (→ 17)

23 Date and Time Setting [CLOCK SET] (→ 66)



VCR Mode Menu

- ① Index Search [INDEX] (→ 34,35)
- ② Blank Search [B.SEARCH] (→ 32)
- ③ Audio Output Mode [AUDIO] (→ 49)
- ④ Recording Speed Mode [REC-SPEED] (→ 14)
- ⑤ Microphone Sensitivity level [MIC LEVEL] (→ 48)
- ⑥ Automatic Printing [AUTOPRINT]
- ⑦ LCD Lighting Mode [LCD B.L.] (→ 68)
- ⑧ LCD and Finder Adjustment [LCD/EVF SET] (→ 68)
- ⑨ Counter Display Mode [COUNTER] (→ 80)
- ⑩ Counter Reset [C.RESET] (→ 76)
To reset the counter to zero.
However, the Time Code cannot be reset.
- ⑪ Date and Time Indication [DATE/TIME] (→ 25)
- ⑫ Remote Controller Mode [REMOTE] (→ 54)
- ⑬ Date and Time Setting [CLOCK-SET] (→ 66)



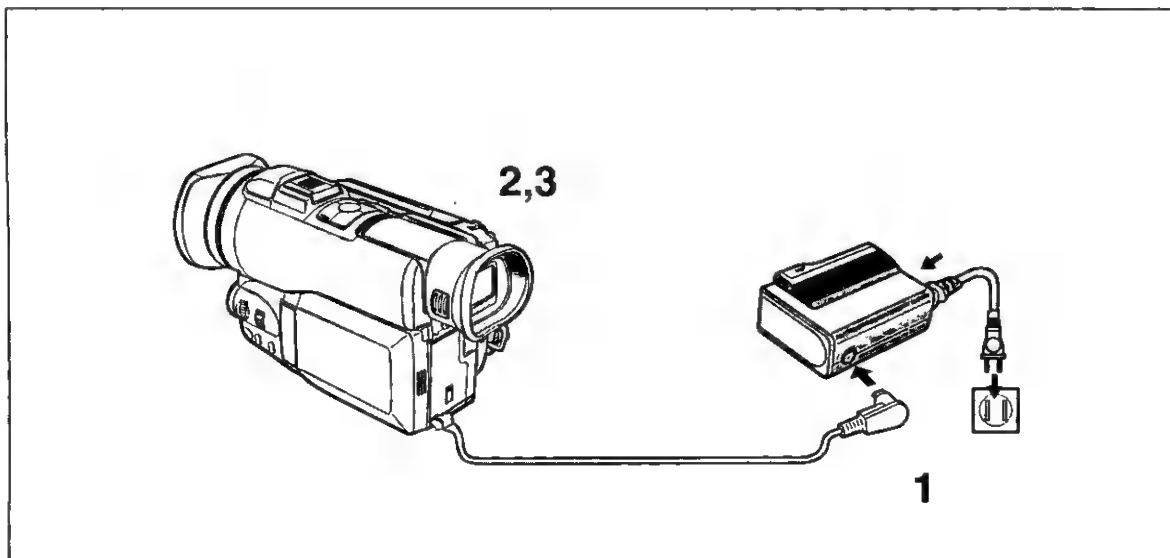
Setting the Date and Time

If the Movie Camera is in the Camera Mode, press the [MENU] Button, select [OTHERS], and then set [CLOCK SET] to [ON].

If the Movie Camera is in the VCR Mode, press the [MENU] Button, and then set [CLOCK SET] to [ON]. The menu shown above is now appeared. (→ 62,65)

For example: To set the clock to 15th October 1998, 2:30 PM.

- 1** Turn the [PUSH] Dial to set to [1998].
- 2** Press the [PUSH] Dial to select [MONTH].
- 3** Turn the [PUSH] Dial to set to [OCT].
- 4** Press the [PUSH] Dial to select [DAY].
- 5** Turn the [PUSH] Dial to set to [15].
- 6** Press the [PUSH] Dial to select [HOUR].
- 7** Turn the [PUSH] Dial to set to [2PM].
- 8** Press the [PUSH] Dial to select [MINUTE].
- 9** Turn the [PUSH] Dial to set to [30].
- 10** Press the [MENU] Button to finish the date and time setting.
The operation of the clock starts from [00] seconds.



- As small imprecisions in the time indication can occur, we recommend that you confirm that the time shown is correct before you start recording. When the [CLOCK BATTERY] Indication appears, charge the built-in lithium battery and set the date and time again.
- The years change in the following order:
1990 → 1991 → ... → 2089 → 1990 → ..

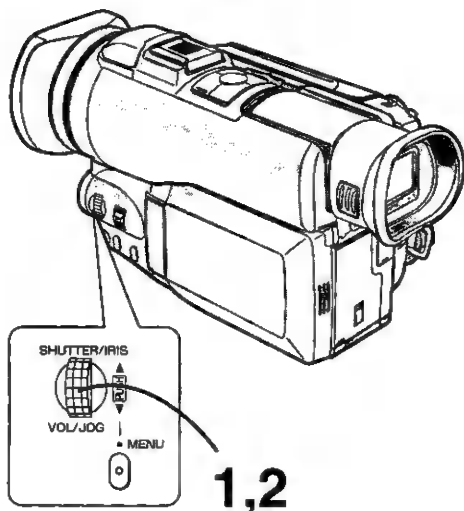
Charging the Built-in Lithium Battery

The built-in battery maintains the operation of the clock. When the [CLOCK BATTERY] Indication appears, the built-in lithium battery is discharged. Charge the discharged battery in the following way and after charging is finished, set the date and time.

1 Connect the AC Adaptor to the Movie Camera and to an AC Outlet.
(→ 11)

2 Leave the Movie Camera turned off.

3 Leave the Movie Camera in this condition for approximately 4 hours.
After charging for 4 hours, the built-in lithium battery can power the clock for approximately 3 months.



MENU			
1	DIS	OFF	ON
	D ZOOM	OFF	X 30 X 120
	D FUNCTION	OFF	WIPE MIX GAINUP
	STROBE	OFF	ON
	PROG AE	OFF	ON
		1	1/2 1/4 1/8 1/16 1/32 1/64 1/128 1/256
END - PUSH MENU KEY			

MENU			
2	ZEBRA	OFF	ON
	WIND-CUT	OFF	ON
	COUNTER	OFF	ON
	MEMORY	OFF	ON
	T CODE	OFF	ON
	D RESET	OFF	ON
	DATE/TIME	OFF	ON
	OTHERS	OFF	ON
END - PUSH MENU KEY			

MENU (OTHERS)			
3	SELF-REC	NORMAL	MIRROR
	LCD B.L	NORMAL	BRIGHT
	LCD/EVF SET	OFF	ON
	REMOTE	OFF	VCR1 VCR2
	INDEX	DAY	SHOUR
	TALLY-LED	OFF	ON
	CLOCK-SET	OFF	ON
END - PUSH MENU KEY			

LCD/EVF SETTING	
LCD BRIGHT	LOW --- HIGH
LCD COLOR	PALE --- VIVID
EVF BRIGHT	LOW --- HIGH
END - PUSH MENU KEY	

Adjusting the LCD Monitor

If the Movie Camera is in the Camera Mode, press the [MENU] Button, select [OTHERS], and then set [LCD/EVF SET] to [ON].

If the Movie Camera is in the VCR Mode, press the [MENU] Button, and then set [LCD/EVF SET] to [ON].

The following items now appear: (→ 62,64)

LCD Brightness [LCD BRIGHT]

To adjust the brightness of the LCD screen. The Bar Indication is divided into 8 steps. The more vertical bars are shown, the brighter is the screen.

LCD Color Level [LCD COLOR]

To adjust the color saturation of the LCD screen. The Bar Indication is divided into 8 steps. The more vertical bars are shown, the stronger are the colors.

Finder Brightness [EVF BRIGHT]

To adjust the brightness of the Finder. The Bar Indication is divided into 8 steps. The more vertical bars are shown, the brighter is the screen.

1 Press the [PUSH] Dial to select the item that you want to adjust.

2 Turn the [PUSH] Dial. Turning it increases or decreases the number of vertical bars of the Bar Indication.

Boosting the Brightness of the Whole LCD Monitor

Setting [LCD B.L] on the Menu to [BRIGHT] brightens up the LCD Monitor.

• These adjustments have no influence on the actually recorded picture.

Cautions for Use

Take care that no water enters the Movie Camera when using it in the rain and snow or on the beach.

- The Movie Camera and the cassette could become damaged. (It might not be repairable.)

Keep the Movie Camera away from magnetized equipment (TVs, TV games, etc.).

- If you use the Movie Camera on or near a TV, the electromagnetic radiation may cause picture and sound distortion.
- Strong magnetic fields generated by speakers and large motors may damage the recordings on the tape and distort the picture.
- The electromagnetic radiation from micro-computers can adversely influence the Movie Camera and cause picture and sound distortion.
- If the Movie Camera is adversely influenced by magnetized equipment and does not work correctly, turn the Movie Camera off, remove the Battery or disconnect the AC Adaptor and insert the Battery or connect the AC Adaptor again. Then turn the Movie Camera on.

Do not use the Movie Camera near a radio transmitter or high-voltage power line.

- If you record near a radio transmitter or high-voltage power line, the recorded picture and sound may be adversely influenced.

Do not use the Movie Camera for surveillance and other industrial applications.

- If the Movie Camera is being used for a long time, the inside temperature could rise excessively and this may cause malfunction.
- This Movie Camera is not designed for industrial use.

Take care that no sand and fine dust enters the Movie Camera when using it on a beach or similar places.

- Sand and dust could damage the Movie Camera and cassette. (Be careful when inserting and removing the cassette.)

Take care not to drop the Movie Camera when carrying it.

- Strong shocks could damage the body of the Movie Camera and cause malfunction.
- When carrying, hold the Movie Camera by the Grip Belt or Shoulder Strap and handle it with care.

Do not spray insecticide or volatile agents on the Movie Camera.

- Such agents could deform the body and cause the surface coating to peel off.
- Do not leave the Movie Camera in direct contact with rubber or plastic products for a long time.

Do not use benzine or thinner for cleaning.

- They could deform the body and cause the surface coating to peel off.
- Before cleaning, remove the Battery or unplug the AC Power Cord from the AC Outlet.
- Wipe the Movie Camera with a soft, clean cloth. To remove persistent stains, wipe with a cloth moistened with mild detergent diluted with water, and then finish with a dry cloth.

After use, always take out the cassette and remove the Battery or unplug the AC Power Cord from the AC Outlet.

- If you leave the cassette in the Movie Camera, the tape can become loosened and damaged.
- If you leave the battery in the Movie Camera for a long time, the voltage level may drop very low so that the Battery cannot be used any more even after charging.

■Condensation

Determining Whether Condensation Has Formed Inside and Remedy for Condensation

If the Condensation Indication flashes after you turn on the Movie Camera, condensation has formed inside the Movie Camera. In this case, the Movie Camera automatically switches off after a few seconds.

Remedy as follows:

1 Take out the cassette.

All other functions do not work. Depending on the amount of condensation, it may not be possible to take out the cassette. In this case, wait 2 - 3 hours before taking out the cassette.

2 Leave the Cassette Compartment open and wait for 2 - 3 hours.

The required time depends on the amount of condensation and the ambient temperature.

3 After 2 - 3 hours, turn the Movie Camera on and check if the Condensation Indication is not displayed.

Even if the Condensation Indication is no longer displayed, wait 1 more hour for added safety before using the Movie Camera again.

Pay Attention to Condensation Even Before the Condensation Indication Appears.

- As condensation forms gradually, the Condensation Indication may not appear for the first 10 - 15 minutes after condensation has formed inside.
- In an extremely cold place, the condensation could freeze and turn into frost. In such a case, it takes an additional 2 - 3 hours for the frost to first melt into condensation and then to be dissolved.

Remedy for a Fogged-up Lens

Set the [POWER ON/OFF] Switch to [OFF] and leave the Movie Camera in this condition for about 1 hour. When the lens has reached about the same temperature as its surroundings, it automatically clears up.

■Video Head Clogging and Remedy

If the video heads (which contact the tape) are dirty, the playback picture contains rectangular blocks of picture noise or the whole screen becomes blue. If they are very dirty, the recording performance deteriorates and in the worst case, recording may not be possible at all.

Causes of Dirty Video Heads

- A lot of dust in the air.
- High-temperature and high-humidity environment.
- Damaged tape.
- Long-time use.

Periodic Inspection

To ensure optimum picture quality, we recommend that you have worn out parts such as video heads replaced after approximately 1000 hours of use. (However, this depends considerably on the conditions of use such as temperature, humidity and dust.)

■Optimum Use of the Battery

Special Characteristics of the Battery

This Battery is a rechargeable lithium-ion battery. Its ability to generate electric energy is based on an internal chemical reaction. This reaction is easily influenced by ambient temperature and humidity, and the useful operation time that the Battery can provide becomes shorter at high and low temperatures. When used in extremely cold surroundings, the Battery may only be able to provide approximately 5 minutes of operation time. If the Battery becomes extremely hot, a protection function is activated and prevents the use of the Battery for some time.

After Use, Always Take out the Battery.

Be sure to remove the Battery from the Movie Camera. (If it is left in the Movie Camera, a small amount of electric current is consumed even if the Movie Camera is turned off.) Leaving the Battery inserted in the Movie Camera for a very long time could cause it to become excessively discharged, so that it cannot be used any more even after charging.

Discarding a Battery That Has Become Unusable

- The usable life of the Battery is limited.
- Do not throw the Battery in a fire because it could explode.

Keep the Battery's Terminals Clean.

Be careful that the terminals (the two small round openings) do not get plugged up with dust, dirt or other substances.

If you accidentally drop the Battery, confirm that the Battery itself and the terminals are not deformed.

Inserting ■ deformed Battery in the Movie Camera or attaching it to the AC Adaptor could damage the Movie Camera or the AC Adaptor.

■ Precautions for Storage

Before Storing the Movie Camera, Take out the Cassette and Remove the Battery.

Store all equipment in a dry place where the temperature remains relatively constant.

(Recommended temperature is 15°C - 25°C and recommended relative humidity is 40% - 60%.)

Movie Camera

- Wrap it with a soft cloth to prevent dust from entering.

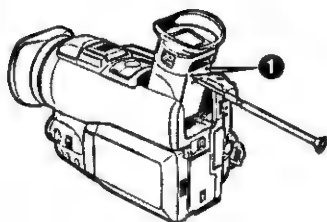
Battery

- Extremely low or high temperature shortens the Battery life.
- Storing it in places with oily smoke and a lot of dust could cause the terminals to get rusty, and this can result in malfunction.
- **Do not allow metal objects (such as necklaces and hair pins) to touch the battery terminals. Short-circuiting may occur and generate heat, and touching it in this condition could inflict serious burns.**
- Store the Battery in discharged condition. If you store the Battery for a long time, we recommend that you charge it once a year and completely use up the charge before storing it again in discharged condition.

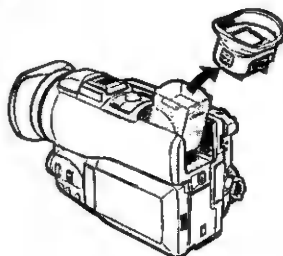
Cassette

- Rewind the tape to its beginning before storing. Leaving the cassette with the tape stopped halfway for more than 6 months (depending on the storing condition) loosens the tape. Be sure to rewind it to the beginning.
- Put the cassette in its case to store it. Dust, direct sunlight (ultraviolet rays) and humidity could damage the tape. Dust contains hard mineral particles and cassettes with dust damage the video heads and other parts of the Movie Camera. Make it a habit to always put the cassette back into its case.
- Completely wind the tape forward and then rewind it once every half year. Leaving the cassette for more than a year without winding/rewinding it may deform the cassette because of stretching and shrinking of the tape due to changes in temperature and humidity. Also, the tape may stick together.
- Do not place the cassette near strongly magnetized objects or equipment.
- The tape surface is coated with microscopic magnetic particles and they record signals. Such objects as magnetic necklaces and toys have stronger magnetic force than commonly thought, and this could erase the recorded contents and cause noise in picture and sound.

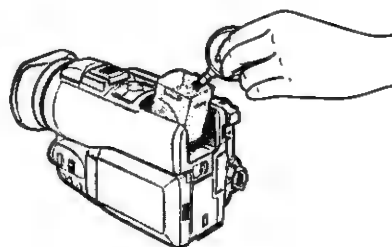
1



2



3



■ LCD Monitor and Lens Hood

LCD Monitor

- In places where big changes in temperature occur, condensation may form on the LCD Monitor. Wipe it with a soft, dry cloth.
- When the Movie Camera is very cold when it is turned on, the picture on the LCD Monitor is initially a little darker than normally. However, as the internal temperature rises, the LCD Monitor regains its normal brightness.
- Extremely high precision technology is employed in producing the LCD Monitor. The result is more than 99.99% effective pixels with a mere 0.01% of the pixels inactive or always lit.

Lens Hood

- If you want to attach a filter from the Filter Kit, be sure to first remove the Lens Hood. However, during recording in the Cinema Mode with ■ filter attached, the four corners of the picture may become dark (vignetting effect), when you push the [W/T] Zoom Lever toward [W].

■ Cleaning the Finder

If dust has entered the Finder, clean it in the following way:

- 1 Unscrew the screws ①.
- 2 Remove the Eyecup.
- 3 Remove the dust with a blower brush (not supplied).
- 4 Reattach the Eyecup.
- 5 Tighten the screws ①.

■ Repeat Playback

- If you keep the Playback Button [▶] pressed for more than 5 seconds, the Movie Camera switches over to the Repeat Playback Mode and the [R PLAY] Indication appears. (To cancel the Repeat Playback Mode, set the [POWER ON/OFF] Switch to [OFF].)

Glossary

■ Digital Video System

In the digital video system, picture and sound are converted into digital signals and recorded onto the tape. This completely digital recording allows recording and playback of picture and sound with minimum quality deterioration.

In addition, such data as Time Code, Date and Time are also automatically recorded as digital signals.

Features

- Superior picture resolution
- Excellent signal-to-noise ratio
- Stable pictures
- Minimized quality deterioration in dubbing
- Minimized cross color distortion
- PCM digital sound
- No picture deterioration in LP Mode
- 6.35 mm-wide tape
- Compact cassette with long recording time
- Minimized quality deterioration in editing
- Time Code editing

Compatibility with S-VHS or VHS Cassettes

As this Movie Camera uses a digital method for recording picture and sound, there is no compatibility with conventional S-VHS or VHS video equipment using analog recording methods.

In addition, the size and shape of the cassette are completely different.

Compatibility with Output Signals

As the video and audio signals output from the audio and video output jacks are analog — the same as in conventional video systems — you can connect this Movie Camera to your S-VHS or VHS VCR or TV for playback.

PCM Digital Sound

For recording of the sound, this Movie Camera offers the choice between two different PCM Audio Recording Modes.

- 16 bit, 48 kHz, 2 channels
- 12 bit, 32 kHz, 4 channels

The "16 bit, 48 kHz, 2 channels" Mode offers superior recording sound quality.

The "12 bit, 32 kHz, 4 channels" Mode lets you record the original sound in stereo on two channels and the dubbed sound in stereo on two separate channels.

Sub Code

The digital recording system offers the added capability of recording sub code containing various data.

The following data is recorded as sub code on this Movie Camera:

- Time code
- Recording date and time
- Index signals for locating still images recorded in the Photoshot Mode
- Index signals for locating the beginning of scenes marked with index signal

■ Focus

If you look at an object through a magnifying glass and move it closer or further away from your eye, you will reach a point where the object becomes clearly visible. Being focused or in focus means that the subject can be seen with optimum clarity and sharpness.

Human Eyes

Human eyes have lenses as well, and when we look at objects at different distances, the shape of these lenses changes automatically so that we can always see these objects clearly.

Movie Camera

The image of the subject enters the Movie Camera through the lens and is converted into an electric signal (video signal) for recording onto magnetic tape. The focus is adjusted either manually or automatically by moving a focusing lens.

Auto Focus Adjustment

The Auto Focus System automatically moves the internal focusing lens forward or backward and adjusts the focus so that the subject can be seen clearly.

The Auto Focus Adjustment has the following characteristics:

- It adjusts until the vertical contours of the subject are as sharp and clean as possible.
- It adjusts the focus on the subjects with strong contrast.
- It adjusts the focus on the subject in the center of the LCD Monitor or Finder.

Unlike human eyes, the lens of the Movie Camera cannot instantaneously change the focus from a nearby to a distant subject and vice versa.

For the following subjects and recording situations, the Auto Focus System cannot provide precise adjustment. Use the Manual Focus Mode instead. (→ 20)

- ❶ Recording subjects with a part of it near the Movie Camera and another part far away from it**
As the Auto Focus adjusts on the center part of the image, it is often impossible to bring the nearby and distant parts of the subject into focus.
When you want to record a person with a distant mountain in the back, it is not possible to focus on both.
- ❷ Recording subjects behind glass covered with dirt or dust**
As the focus is adjusted on the dirty glass, the subject behind the glass is out of focus. When recording a subject across a street on which cars are running, the focus may be adjusted on the cars.
- ❸ Recording subjects in dark surroundings**
As the amount of light information entering through the lens is greatly reduced, the Movie Camera cannot adjust the focus precisely.
- ❹ Recording subjects surrounded by objects with shiny surfaces or much light reflection**
As the Movie Camera adjusts the focus on objects with shiny surfaces or much light reflection, the subject may go out of focus.
Therefore, when recording at a lake or the sea, evening scenes, fireworks, or under special types of lighting, the subject may be out of focus.
- ❺ Recording fast-moving subjects**
As the internal focusing lens is moved mechanically, it cannot follow fast-moving subjects without delay. Therefore, subjects like children running back and forth may temporarily go out of focus.
- ❻ Subjects with weak contrast**
As the Movie Camera adjusts the focus based on vertical contours in the picture, subjects with little contrast such as a white wall may be out of focus.

■ White Balance Adjustment

While most recording with a Movie Camera is probably done outdoors under sunlight, video recording is also done very often under artificial light sources, both indoors and outdoors. However, each of these light sources gives the subject slightly different colors.

Human Eyes

Human eyes can easily adjust to different kinds of lighting and see an object with the same colors even under different lighting.

Movie Camera

Unlike human eyes, the Movie Camera does not have the innate ability to adapt to changes in lighting, and they influence the colors being recorded. Therefore, depending on the light source, the picture would be recorded with a bluish or reddish tint. To minimize the influence of the lighting on the colors of the subject, an adjustment called White Balance Adjustment is necessary.

White Balance Adjustment

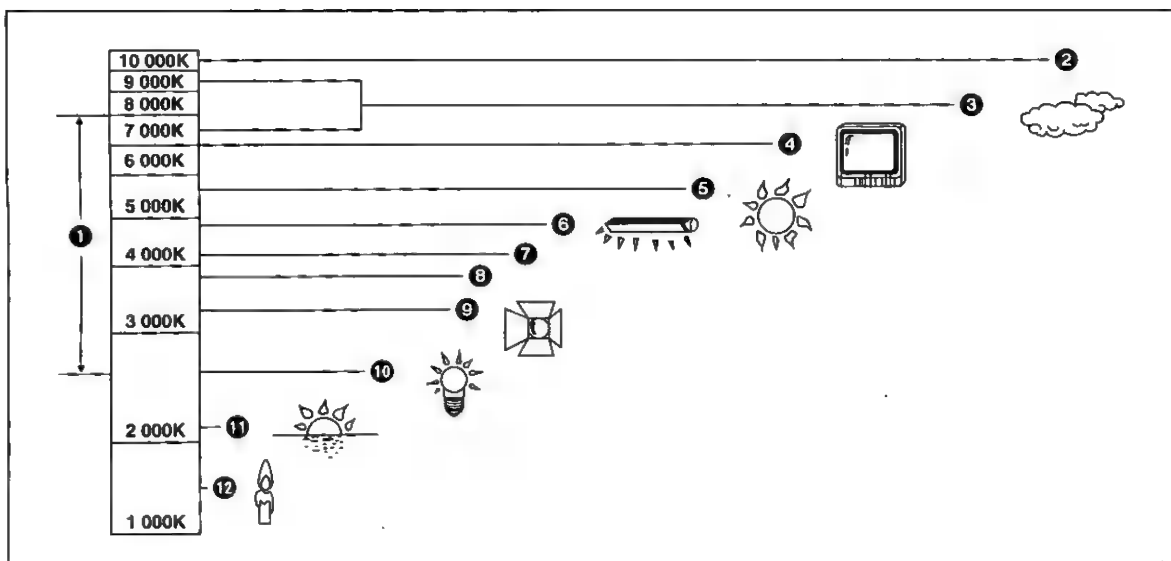
The White Balance Adjustment determines the color of the light and adjusts the colors so that white remains pure white. As white is the basic color of the entire color spectrum, if white is reproduced correctly, the other colors are correct and natural, too.

Auto White Balance Adjustment

This Movie Camera stores the optimum settings for several common light sources in memory. The Movie Camera judges the recording situation by determining the tint of the light received through the lens and by the White Balance Sensor (→ 10), and it selects the setting for the most similar tint. This function is called Auto White Balance Adjustment.

However, as the white balance settings for only a few light sources are stored in memory, the white balance is not correctly adjusted for other lighting conditions.

For the range of different types of lighting within which the Auto White Balance Function can provide precise adjustment, refer to the chart (→ 75). For recording under lighting conditions outside this range, the Auto White Balance Function does not work correctly, and the recorded picture has a red or blue cast. However, the same also applies, if the subject is lit by more than one light source, even if these light sources are within this range.



■ Color Temperature

Every light source has its own color temperature measured in Kelvin (K). The higher the Kelvin value, the more bluish the light; the lower the value, the more reddish the light. The Kelvin value is related to the tint of the light, but not directly to its brightness.

The range ① indicated in the illustration above shows the light sources for which this Movie Camera can provide precise white balance adjustment and, therefore, natural colors in the recorded pictures, when using the Full Auto Mode. For light sources outside this range, adjust the white balance manually (→ 43). Also, additional lighting may be necessary.

- ① Control range of this Movie Camera's Auto White Balance Adjustment Mode
- ② Blue sky
- ③ Cloudy sky (Rain)
- ④ TV screen
- ⑤ Sunlight
- ⑥ White fluorescent lamp
- ⑦ 2 hours after sunrise or before sunset
- ⑧ 1 hour after sunrise or before sunset
- ⑨ Halogen light bulb
- ⑩ Incandescent light bulb
- ⑪ Sunrise or sunset
- ⑫ Candlelight

■ Time Code

Time Code signals are the data which indicates the time in hours, minutes, seconds and frames (30 frames/sec). Having this data included in the recording gives every single picture on the tape its own address.

- The Time Code is automatically recorded as part of the sub code with every recording you make.
- When you insert a new (previously unrecorded) cassette, the Time Code automatically starts from zero. If you insert a recorded cassette, the Time Code continues where the time code of the last previous scene stopped. (In this case, the zero indication [0h:00m:00s:00f] may appear after inserting the cassette, but when the recording starts, the Time Code records from the previous value.)
- You cannot reset the Time Code to zero.
- In playback modes other than the Normal Playback Mode, the Time Code may not be displayed (or not be correct).
- Unless the Time Code is recorded continuously from the beginning of the tape, precise editing may not be possible. To ensure that the Time Code is recorded without interruption, we recommend that you use the Camera Search Function (→ 31) or Blank Search Function (→ 32) before starting to record a new scene.

■ Memory Stop Function

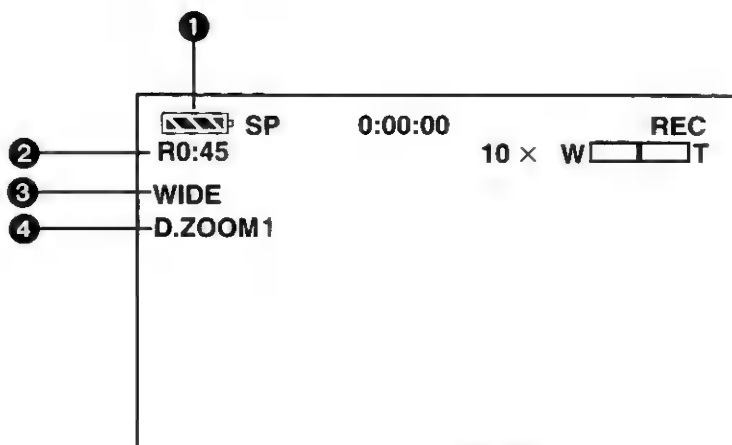
The Memory Stop Function is convenient for the following operations.

Rewinding or fast-forwarding the tape to a desired position

- 1 **Reset the Tape Counter at the tape position from which you want to play back later.**
(→ 64)
- 2 **Set [COUNTER] on the Menu to [MEMORY].**
(→ 62,64)
- 3 **Start playback or recording.**
- 4 **After playback or recording is finished:**
Press the [VCR/CAMERA] Button so that the [VCR] Lamp lights.
- 5 **Rewind the tape.**
The tape automatically stops approximately at the position at which you reset the counter to zero.

Stopping the editing automatically in the audio dubbing

- 1 **Reset the Tape Counter to zero at the tape position at which you want the editing to stop.**
- 2 **Set [COUNTER] on the Menu to [MEMORY].**
(→ 62,64)
- 3 **Play back a still picture at the point at which you want the audio dubbing to start.**
- 4 **Start the audio dubbing.**
The audio dubbing automatically stops approximately at the position at which you reset the counter to zero.




Indications on the LCD Monitor/in the Finder

① Remaining Battery Power

As the remaining battery power decreases, the indication changes as follows:



When the battery is completely discharged, the  () indication flashes.

(When you are using the AC Adaptor, the  indication may appear, however, this has no meaning in this case.)

② Remaining Tape Time

The remaining tape time is displayed in minutes. (When it becomes less than 3 minutes, the indication starts to flash.)

- If a recording lasts less than 15 seconds, the Remaining Tape Time cannot be displayed correctly.
- The displayed remaining tape time may be shorter than the actual remaining tape time.

③ Wide-Screen Mode (→ 23)

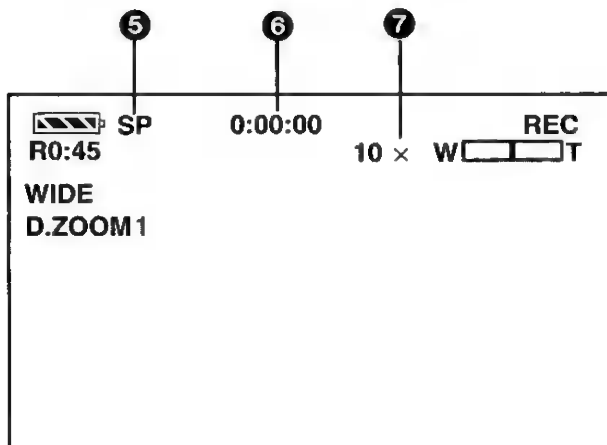
When recording in the Wide Mode, this indication is displayed.

④ Digital Zoom (→ 21)

When the Digital Zoom Function is activated, this indication is displayed.

Digital functions (→ 38)

When a Digital function is activated, the corresponding indication is displayed.



5 Recording Speed Mode (→ 14)

The selected Recording Speed Mode is displayed.

SP: Standard Mode

LP: Long-play Mode

6 Tape Counter, Time Code (→ 80)

The Tape Counter, Memory Stop Function or Time Code Indication is displayed.

7 Zoom Magnification (→ 21)

When you push the [W/T] Zoom Lever up or down, the Zoom Magnification Indication and the Zoom Gauge are displayed.

Recording Mode

(→ 17, 37, 42, 43, 44, 45, 46)

AUTO: No indication appears

MNL: This appears when the Mode Selector Switch is set to the [MNL] position.

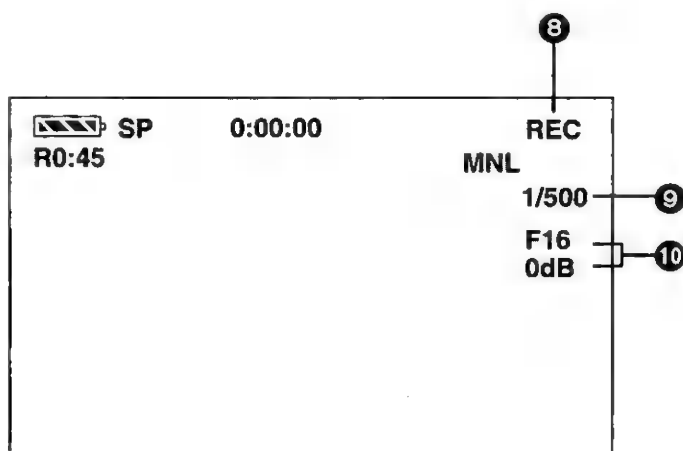
AE LOCK: This appears when the Mode Selector Switch is set to the [AE LOCK] position.

Electronic Image Stabilizer (→ 24)

EIS: When the Digital Electronic Image Stabilization System is activated, this indication is displayed.

Audio Recording Mode (→ 49)

12bit/16bit: The indication of the Audio Recording Mode that was selected for recording is displayed during playback.



8 Tape Run Indications

REC:	Recording (→ 17)
PAUSE:	Recording Pause (→ 17)
PLAY:	Playback (→ 25)
FF:	Fast-forward (→ 26)
REW:	Rewind (→ 26)
CHK:	Recording check (→ 18)
A.DUB:	Audio dubbing (→ 49)
A.DUB:	Audio dubbing pause (→ 49)
PHOTO:	Recording in the Photoshot Mode (→ 22)
BLANK:	Blank Search (→ 32)
R PLAY:	Repeat playback (→ 72)

- When recording with the LCD Monitor facing forward using the Mirror Mode, only the Remaining Battery Power Indication, the Recording Indication [●] and the Recording Pause Indication [||] are displayed.

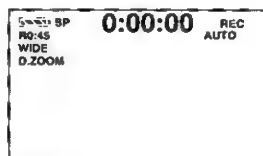
9 Shutter Speed

It appears when you manually adjust the shutter speed. (→ 44)

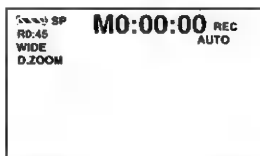
10 Iris Value (F Number)/Gain-up Value

These two indications appear together when you manually adjust the iris and gain. (→ 45)

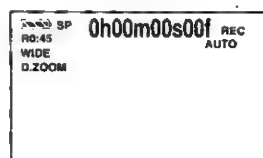
①



②



③



④

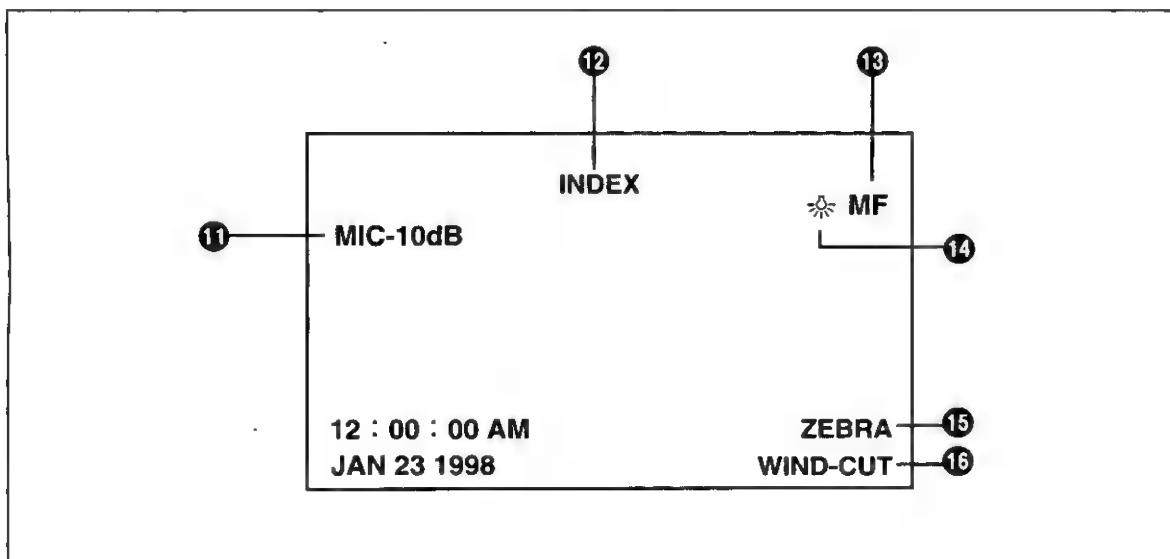


Changing the Indications

By changing the setting for [COUNTER] on the Menu (→64,65) or by repeatedly pressing the [COUNTER/TC] Button on the Remote Controller (→ 59), the Counter Display Mode can be changed in the order shown in the above illustrations ① to ④:

- ① Tape Counter Indication
- ② Tape Counter Indication with activated Memory Stop Indication
- ③ Time Code Indication
- ④ No Indication

(In this mode, only the Tape Run Indications, Warning/Alarm Indications, Date/Time Indications, Programme AE Mode Indications, Manual Focus Mode Indications, White Balance Mode Indications, and Zoom Magnification Indication can be displayed.)



11 Microphone Sensitivity Level

This indication shows the selected microphone sensitivity for recording. When it is displayed in red, it indicates that the sound being recorded is distorted. If you set [MIC LEVEL] on the Camera Mode Menu (→ 63), or [MIC LEVEL] on the VCR Mode Menu (→ 65) to [AUTO], the Microphone Sensitivity Level Indication does not appear.

12 Index (→ 33)

INDEX: The [INDEX] Indication flashes for a few seconds while an index signal is being recorded.

Search Number (→ 35)

S1: The figure indicates which number of scene ahead from the present scene is to be played back.

13 Manual Focus (→ 20)

If you select the Manual Focus Mode, the [MF] Indication is displayed. When the Movie Camera is in the Auto Mode, this indication is not displayed.

14 White Balance Mode (→ 42)

The White Balance Mode offers the following possible settings:

- ☀: Indoor (Incandescent Lamp) Mode
- ☀: Indoor (fluorescent lamp) Mode
- ☀: Outdoor Mode
- ☀: Lock Mode

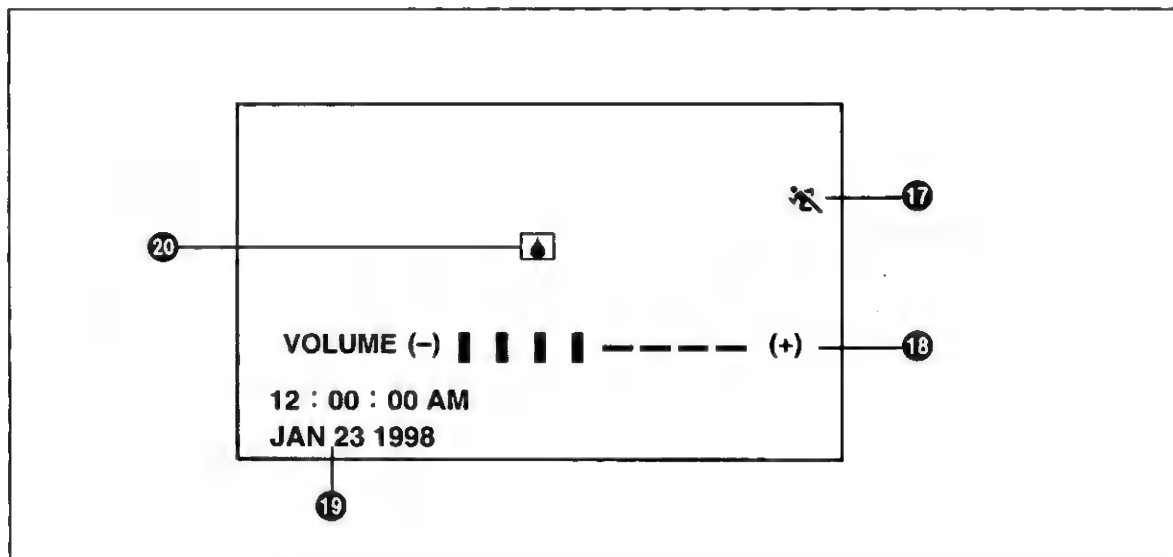
When the Movie Camera is in the Auto Mode, none of the above 3 indications are displayed.

15 Zebra Pattern

If you set [ZEBRA] on the Menu (→ 64) to [ON], the [ZEBRA] Indication is displayed.

16 Wind Buffer [WIND-CUT]

If you set [WIND-CUT] on the Menu (→ 64) to [ON], the [WIND-CUT] Indication is displayed.



17 Programme AE Mode (→ 44)

The Programme AE Function offers the following settings:

-  : Sports Mode
-  : Portrait Mode
-  : Low Light Mode
-  : Spot-Light Mode
-  : Surf & Snow Mode

18 Sound Volume (→ 25)

Use this indication to adjust the volume of the playback sound from the built-in speaker. With the [VCR] Lamp lit, keep the [PUSH] Dial pressed until the [VOLUME] indication appears. Then turn the [PUSH] Dial to adjust the volume.

19 Date and Time (→ 25)

The time is indicated in the 12-hour system.


CLOCK BATTERY (→ 67)

The built-in battery is discharged.


20 Warning/Alarm

When any of the following indications lights or flashes, confirm the condition of the Movie Camera.

WARNING: Condensation has occurred. (→ 70)

 : The erasure prevention slider of the inserted cassette is closed (set to [SAVE]).
No cassette is inserted.

WARNING: The heads are dirty.

 **END:** During recording, the tape has reached its end.

REMOTE: Wrong Remote Controller Mode is selected. (→ 54)

Before Requesting Service (Problems & Solutions)

Power Supply

- P1: The Movie Camera does not turn on.**
S1: Is the Battery or the AC Adaptor connected correctly? Confirm the connection. (→ 11)
- P2: The Movie Camera has turned off automatically.**
S2: If you leave the Movie Camera in the Recording Pause Mode for more than 5 minutes, it automatically switches off to protect the tape and to conserve battery power. (→ 17)
- P3: The Movie Camera quickly turns off.**
S3-1: Is the Battery discharged? When the Remaining Battery Power Indication is flashing or the [] Indication is displayed, the Battery is discharged. Charge the Battery or insert a fully charged Battery. (→ 12, 77)
S3-2: Has condensation formed? If the Movie Camera is brought from a cold to a warm place, condensation may form inside. In this case, the Movie Camera automatically switches off and no operation can be performed except taking out the cassette. Wait until the Condensation Indication disappears. (→ 70)

Battery

- P1: The Battery discharges quickly.**
S1-1: Is the Battery fully charged? Charge it until all 4 Charge Lamps on the AC Adaptor light. (→ 12)
S1-2: Are you using the Battery in a place where the temperature is very low? The ambient temperature greatly influences the Battery's performance. Its operation time becomes shorter in a cold place. (→ 70)
S1-3: Has the Battery reached the end of its service life? The service life of the Battery is limited. It depends on the way the Battery is used, but when the operation time even after proper charging is too short for normal use, the service life of the Battery has reached its end.

Normal Recording

- P1: Recording cannot be started even though the Movie Camera is supplied with power and the cassette is inserted correctly.**
S1-1: Is the erasure prevention slider of the cassette open? If it is open (set to [SAVE]), recording is not possible. (→ 14)
S1-2: Has the tape reached its end? Insert a new cassette. (→ 14)
S1-3: Is the Movie Camera turned on? (→ 17)
S1-4: Is the [VCR] Lamp lit? If it is lit, recording is not possible. (→ 25)
S1-5: Is the Condensation Indication [WARNING] displayed? When condensation has formed, no functions except taking out the cassette can be operated. Wait until the Condensation Indication disappears. (→ 70)

Other Recording

- P1: The picture on the LCD Monitor/in the Finder suddenly stands still for a few seconds.**
S1-1: Did you press the [PHOTO SHOT] Button? If you press the [PHOTO SHOT] Button, a still picture is recorded for approximately 7 seconds. After approximately 7 seconds, the Movie Camera switches back to the Recording Pause Mode. (→ 22)
S1-2: Did you press the Still Button []? If you press the Still Button [], the picture stands still. Simply press this button again to return to the normal moving picture. (→ 24)
- P2: The Auto Focus Function does not work.**
S2-1: Is the Manual Focus Mode selected? If you select the Auto Focus Mode, the focus is adjusted automatically. (→ 20)
S2-2: Is the subject or recording situation suitable for the Auto Focus Mode? The Auto Focus Function does not work correctly for some kinds of subjects and recording situations. In this case, use the Manual Focus Mode to adjust the focus. (→ 75)

Editing

- P1: Audio dubbing cannot be performed.**
S1-1: Is the erasure prevention slider of the cassette open? If it is open (set to [SAVE]), editing is not possible. (→ 14)
S1-2: Are you trying to edit parts of the tape recorded in the LP Mode? As the tracks recorded in the LP Mode are narrower than the heads, audio dubbing is not possible. (→ 14)

Indications

- P1: The Time Code becomes incorrect.**
S1: In the Slow Motion Playback Mode in reverse direction, the counter of the Time Code Indication may not be stable, however, this is not a malfunction.
- P2: The Remaining Tape Time Indication disappears.**
S2: If you record a still picture in the Photoshot Mode, the Remaining Tape Time Indication disappears temporarily. However, if you switch the Movie Camera over to the Normal Recording Mode, it appears again.
- P3: The Remaining Tape Time Indication does not match the actual remaining tape time.**
S3-1: If scenes of less than 15 seconds are recorded successively, the remaining tape time is not indicated correctly.
S3-2: The Remaining Tape Time Indication may show a remaining tape time that is 2 - 3 minutes shorter than the actual remaining tape time.

Playback (Picture)

- P1: No playback picture is reproduced when pressing the Play Button [▶].**
S1: Did you press the [VCR/CAMERA] Button so that the [VCR] Lamp lights? When the [VCR] Lamp is not lit, no playback functions can be operated. (→ 25)
- P2: Mosaic-like patterns appear in the picture during Cue, Review or Slow Motion Playback.**
S2: This phenomenon is a characteristic of the digital video system. This is not a malfunction. (→ 26)
- P3: I want to play back the picture on a TV.**
S3: If you attach the Docking Station to the Movie Camera, you can connect the Movie Camera to a TV. (→ 25)
- P4: The Movie Camera is correctly connect to a TV, but no playback picture is reproduced.**
S4: Did you select "Video Input" on the TV? Carefully read the operating instructions for your TV and select the channel that matches the input jacks used for connection.
- P5: The playback picture is not reproduced clearly.**
S5: Are the video heads on the Movie Camera dirty? If the video heads are dirty, the picture cannot be played back clearly.

Playback (Sound)

- P1: No sound is played back from the Movie Camera's built-in speaker.**
S1: Is the volume set too low? With the [VCR] Lamp lit, keep the [PUSH] Dial pressed until the [VOLUME] Indication appears. Then turn the [PUSH] Dial to adjust the volume. (→ 25)
- P2: Different sounds are played back together.**
S2: Is [AUDIO] set to [MIX] on the VCR Mode Menu? If you have performed audio dubbing on a cassette for which you set [AUDIO REC] to [12bit] for recording, the original sound and the sound dubbed with audio dubbing are played back together. It is also possible to play them back individually. (→ 49)
- P3: The original sound was erased by performing audio dubbing.**
S3: If you perform audio-dubbing on a recording made in the [16bit] Mode (→ 49), the original sound is erased. If you want to keep the original sound, be sure to select the [12bit] Mode for the original recording.

Others

- P1: The cassette cannot be taken out.**
S1: Is the Movie Camera supplied with power? Is the AC Adaptor correctly connected or the Battery correctly inserted? To remove the cassette, the Movie Camera must be supplied with power, however, it is not necessary to set the [POWER ON/OFF] Switch to [ON].
- P2: No operation except taking out the cassette can be performed.**
S2: Is the Condensation Indication [WARNING] displayed? If condensation has formed inside the Movie Camera, it automatically switches off and prevents any operation except taking out the cassette. Wait until the Condensation Indication disappears. (→ 70)
- P3: The Remote Controller does not work.**
S3-1: Is the button-type battery in the Remote Controller exhausted? If the Remote Controller does not work when you use it near the Remote Controller Sensor on the Movie Camera, the button-type battery is exhausted. Replace it with a new battery. (→ 53)
S3-2: Is the correct Remote Controller Mode selected? If the Movie Camera's setting for [REMOTE] on the Menu and the mode selected on the Remote Controller are not matched, operating the Movie Camera with the Remote Controller is not possible and the [REMOTE] Indication is displayed. (→ 54)

Specifications

Digital Video Camera

Information for your safety

Power Source:	DC 7.2 / 8.4 V
Power Consumption:	9 W

Recording Format: Mini DV (Consumer-use Digital Video SD Format)
Tape Used: 6.35 mm digital video tape
Recording/Playback Time: SP: 80 min.
LP: 120 min. (with AY-DVM80EA)

Video

Recording System: Digital Component
Television System: EIA Standard (525lines, 60fields)NTSC color signal

Audio

Recording System: PCM Digital Recording
16 bit (48 kHz/2ch),
12 bit (32 kHz/4ch)
Image Sensor: 1/4-inch 3CCD Image Sensor
Lens: Auto Iris, F1.6, Focal Length;
4.0 - 48 mm, Macro (Full Range AF)
Filter Diameter: 43 mm
Zoom: 12:1 Power Zoom
Monitor: 2.5-inch LCD
Microphone: Stereo
Speaker: 1 round speaker Ø 20 mm
Standard Illumination: 1,400 lx
Minimum Required Illumination: 1 lx (Digital Gain-up Mode)
Video Output Level: 1.0 Vp-p, 75 ohm
S-Video Output Level: Y Output: 1.0 Vp-p, 75 ohm
C Output: 0.3 Vp-p, 75 ohm
Audio Output Level: 316 mV
Digital Still Picture: Digital Still Picture Output, Control
Signal Input/Output
(Transfer rate: max. 115 kbps)
Digital Interface: DV Output Terminal (compliant with IEEE1394, 4-pin)
Dimensions: Approx. 80 (W) × 105 (H) × 189 (D) mm
Weight: Approx. 690 g (without Battery)
Approx. 800 g (with PV-DBP5 and AY-DVM30EA)

Operating Temperature: 0°C - 40°C
Operating Humidity: 10% - 80%

AC Adaptor.

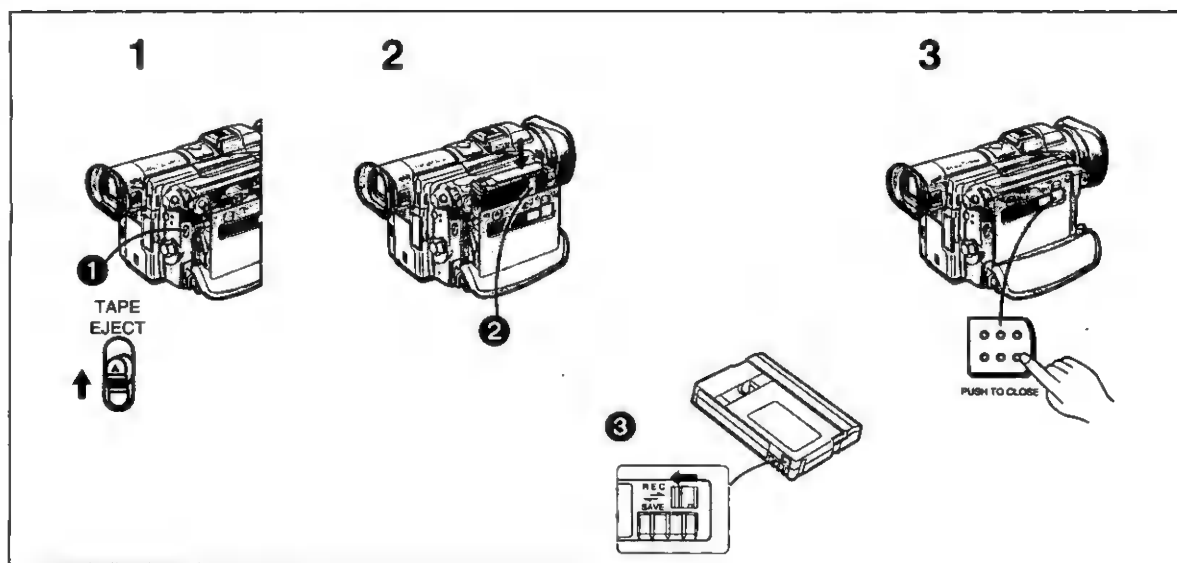
Information for your safety

Power Source:	AC 100~240 V, 50/60 Hz
Power Consumption:	20W 2W (when not in use)

Dimensions: 72 (W) × 43 (H) × 98 (D) mm
Weight: Approx. 170 g

Weight and dimensions shown are approximate.
Specifications are subject to change without notice.

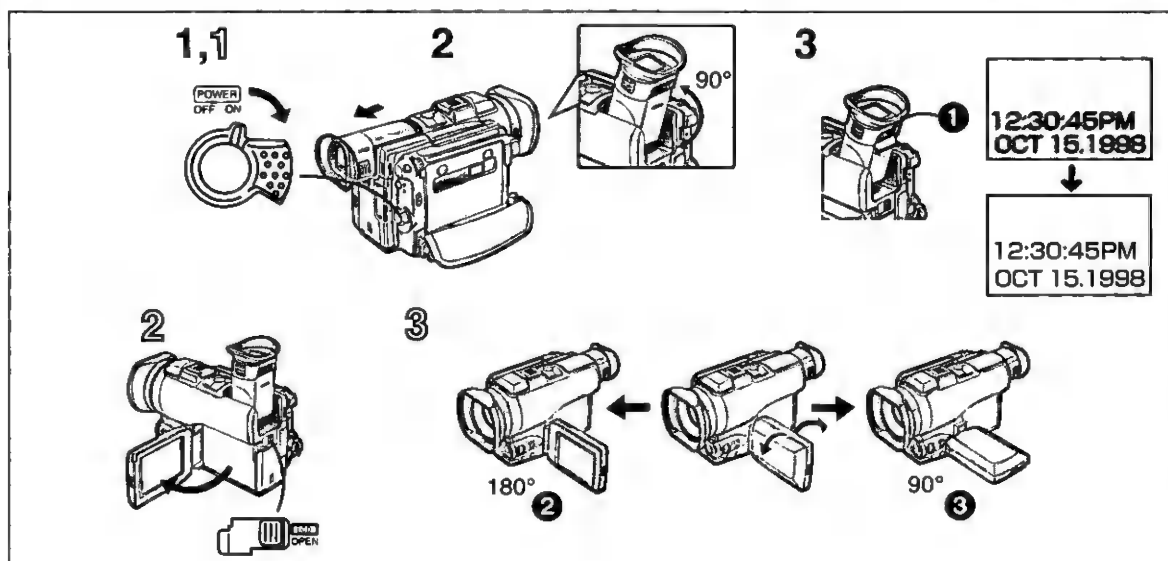
Spanish Quick Use Guide/Guía Para Uso Rápido



Insertión del casete

- 1** Deslice la palanca [TAPE EJECT] ① hacia arriba para abrir el compartimiento del casete.
- 2** Inserte el casete.
Inserte el casete con su ventana en la posición ②.
- 3** Cierre el compartimiento del casete y oprima el botón [PUSH TO CLOSE] para bloquearlo.

Spanish Quick Use Guide/Guía Para Uso Rápido



Uso del visor

Antes de usar el visor, ajústelo a su vista para que las indicaciones queden bien claras y puedan verse fácilmente.

- 1** Ponga el interruptor [POWER ON/OFF] en [ON].
- 2** Deslice el visor hacia atrás.
- 3** Ajuste deslizando el mando corrector del ocular ①.

Uso del monitor LCD

También se puede grabar mientras se observa la imagen en el monitor LCD abierto.

- 1** Ponga el interruptor [POWER ON/OFF] en [ON].
- 2** Empuje la palanca [LCD OPEN] y gire el monitor LCD hacia fuera, en el sentido de la flecha, 90° aproximadamente.
El visor se apaga.

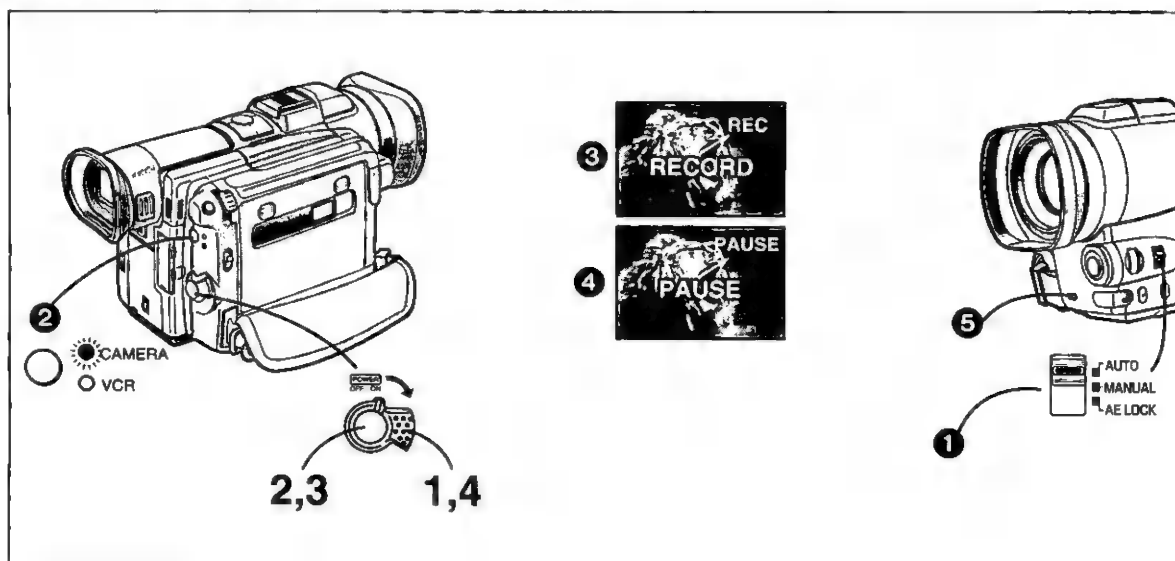
Ajuste del ángulo

- 3** Ajuste el ángulo del monitor LCD según el ángulo de grabación deseado.
◆ El monitor LCD gira hacia arriba un máximo de 18° ② y hacia abajo un máximo de 90° ③ a partir de su posición vertical normal.

Cierre del monitor LCD

Empuje el monitor LCD hasta que haga clic la palanca [LCD OPEN].

Spanish Quick Use Guide/Guía Para Uso Rápido



Grabación

Cuando el selector de modo se ponga en [AUTO] ①, usted podrá encender simplemente la videocámara y oprimir el botón de inicio/parada para iniciar la grabación, y el enfoque y el equilibrio del blanco se ajustarán automáticamente.

1 Ponga el interruptor [POWER ON/OFF] en [ON].

La lámpara [CAMERA] se enciende. ②

2 Oprima el botón de inicio/parada.

La grabación empieza.

La indicación [RECORD] aparece brevemente y luego cambia a [REC]. ③

3 Para hacer una pausa en la grabación:

Oprima de nuevo el botón de inicio/parada.

La indicación [PAUSE] aparece. ④

4 Para finalizar la grabación:

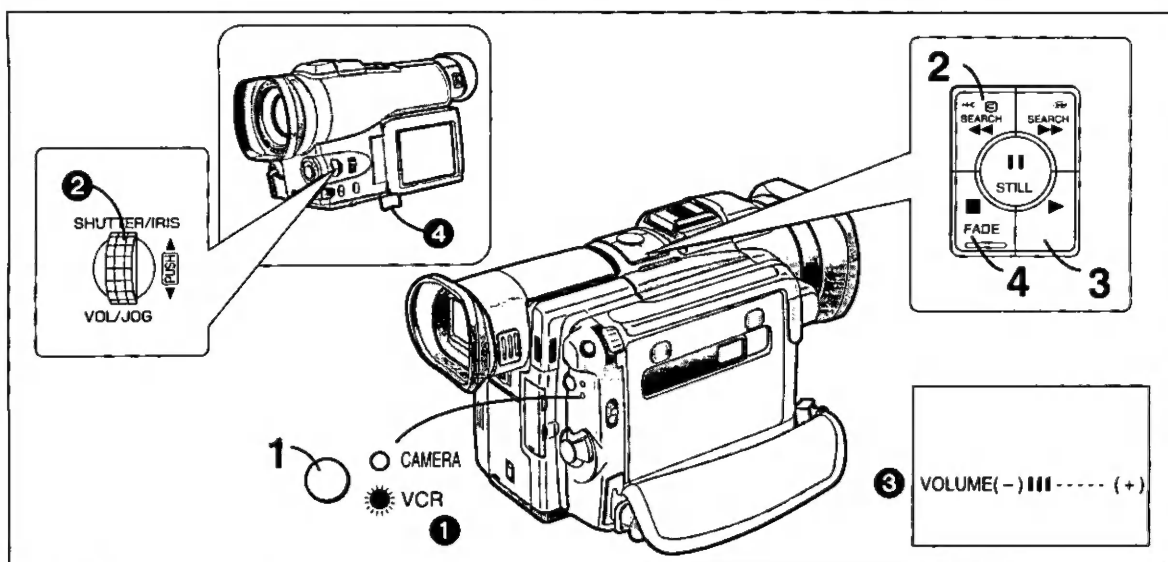
Ponga el interruptor [POWER ON/OFF] en [OFF].

LED de indicación

El LED de indicación ⑤ se enciende durante la grabación para indicar que la grabación está siendo realizada.

Si usted selecciona [OTHERS] en el menú y luego pone [TALLY-LEC] en [OFF], la lámpara de grabación no se encenderá.

Spanish Quick Use Guide/Guía Para Uso Rápido



Para ver las imágenes recién grabadas en la videocámara

(Reproducción)

- 1** Oprima el botón [VCR/CAMERA] para que se encienda la lámpara [VCR] ①.
- 2** Oprima el botón de rebobinado [◀◀] para rebobinar la cinta.
- 3** Oprima el botón de reproducción [▶▶] para iniciar la reproducción.
- 4** Para detener la reproducción: Oprima el botón de parada [■].

■ Ajuste del volumen del sonido

Mantenga oprimido el control [PUSH] ② hasta que aparezca la indicación [VOLUME] ③. Luego, gire el control [PUSH] para ajustar el volumen. Para que desaparezca la indicación [VOLUME], oprima de nuevo el control [PUSH] hasta que desaparezca la indicación [VOLUME].

Para que aparezca la indicación de la fecha/hora

Esta videocámara graba automáticamente la fecha y la hora, sin embargo no las graba directamente en imagen, sino como parte de un código secundario.

Para que aparezca la indicación de la fecha/hora, ponga [DATE/TIME] en el menú en el ajuste deseado.

Utilización de la pata de apoyo para ver fácilmente la reproducción

Al extender la pata de apoyo ④ desde la parte inferior de la videocámara resulta más fácil ver la imagen de reproducción en el monitor LCD.

Warranty

Panasonic Consumer Electronics Company, Division of Matsushita Electric Corporation of America
One Panasonic Way Secaucus,
New Jersey 07094

Panasonic Sales Company, Division of Matsushita Electric of Puerto Rico, Inc.
Ave. 65 de Infantería, Km. 9.5
San Gabriel Industrial Park, Carolina,
Puerto Rico 00985

PANASONIC Video Products Limited Warranty

Panasonic Consumer Electronics Company or Panasonic Sales Company (collectively referred to as "the Warrantor") will repair this product with new or refurbished parts, free of charge, in the USA or Puerto Rico, in the event of a defect in materials or workmanship as follows (all time periods commence from the date of the original purchase):

PRODUCT	PARTS	LABOR
CAMCORDER	ONE (1) YEAR, EXCEPT CCD IMAGE SENSOR CCD IMAGE SENSOR - SIX (6) MONTHS	NINETY (90) DAYS NINETY (90) DAYS
VCR	ONE (1) YEAR	NINETY (90) DAYS
A/V MIXER	ONE (1) YEAR	NINETY (90) DAYS
MONITOR-VCR	ONE (1) YEAR, EXCEPT CRT CRT - TWO (2) YEARS	NINETY (90) DAYS CRT - NINETY (90) DAYS CUSTOMER PAYS ALL LABOR CHARGES AFTER 90 DAYS

Monitor-VCR In-home or carry-in Service: 22" (diagonal) CRT / LCD and Larger
Monitor-VCR Carry-in Service: 21" (diagonal) CRT / LCD and smaller

Batteries (if included) - New rechargeable batteries in exchange for defective rechargeable batteries for ten (10) days. Non-rechargeable batteries are not warranted.

Tape (if included) - New video cassette tape in exchange for a defective video cassette tape for five (5) days.

In-home, carry-in or mail-in service, as applicable, in the USA can be obtained during the warranty period by contacting a Panasonic Services Company (PASC) Factory Servicenter listed in the Service Directory. Or call toll free 1-800-211-PANA (7262), to locate an authorized PASC Servicenter. Carry-in or mail-in service in Puerto Rico can be obtained during the warranty period by calling the Panasonic Sales Company telephone number listed in the Servicenter Directory.

This warranty is extended only to the original purchaser. A purchase receipt or other proof of the date of the original purchase is required before warranty service is rendered.

This warranty only covers failures due to defects in materials and workmanship which occur during normal use and does not cover normal maintenance, including, but not limited to, video and audio head cleaning. The warranty does not cover damage which occurs in shipment, or failures which are caused by products not supplied by the warrantor, or failures which result from accident, misuse, abuse, neglect, mishandling, misapplication, alteration, modification, faulty installation, set-up adjustments, improper antenna, inadequate signal pickup, maladjustment of consumer controls, improper operation, power line surge, improper voltage supply, lightning damage, commercial use such as hotel, office, restaurant, or other business or rental use of the product, or service by anyone other than a PASC Factory Servicenter or a PASC authorized Servicenter, or damage that is attributable to acts of God.

LIMITS AND EXCLUSIONS

There are no express warranties except as listed above.

THE WARRANTOR SHALL NOT BE LIABLE FOR INCIDENTAL OR CONSEQUENTIAL DAMAGES (INCLUDING, WITHOUT LIMITATION, DAMAGE TO TAPES) RESULTING FROM THE USE OF THIS PRODUCTS, OR ARISING OUT OF ANY BREACH OF THE WARRANTY. ALL EXPRESS AND IMPLIED WARRANTIES, INCLUDING THE WARRANTIES OF MERCHANTABILITY AND FITNESS FOR PARTICULAR PURPOSE, ARE LIMITED TO THE APPLICABLE WARRANTY PERIOD SET FORTH ABOVE. Some states do not allow the exclusion or limitation of incidental or consequential damages, or limitations on how long an implied warranty lasts, so the above exclusions or limitations may not apply to you.

This warranty gives you specific legal rights and you may also have other rights which vary from state to state.

If a problem with this product develops during or after the warranty period, you may contact your dealer or Servicenter. If the problem is not handled to your satisfaction, then write to the Customer Satisfaction Center at the Panasonic Consumer Electronics Company address above.

SERVICE CALLS WHICH DO NOT INVOLVE DEFECTIVE MATERIALS OR WORKMANSHIP AS DETERMINED BY THE WARRANTOR, IN ITS SOLE DISCRETION, ARE NOT COVERED. COSTS OF SUCH SERVICE CALLS ARE THE RESPONSIBILITY OF THE PURCHASER.

warvid 10/20/97

Service Center List

For Product Information, Operating Assistance, Literature Request, Dealer Locations, and all Customer Service inquiries please contact:

1-800-211-PANA (7262), Monday-Friday 9am-9pm Saturday-Sunday 9am-7pm, EST.

Web Site: <http://www.panasonic.com>

You can purchase parts, accessories or locate your nearest servicer by visiting our Web Site.

Accessory Purchases:

Customer Orders Only 800-332-5368 (Customer Orders Only)

Panasonic Services Company 20421 84th Avenue South, Kent, WA 98032

(6 am to 5 pm Monday - Friday; 6 am to 10:30 am Saturday; PST)

(Visa, MasterCard, Discover Card, American Express, Check)

Product Repairs

Centralized Factory Service Center

Panasonic Services Company

1705 N. Randall Road,

Elgin, IL 60123-7847

Attention: Digital Camera Repair

MAIL TO:

Please carefully pack and ship, prepaid and insured, to the Elgin centralized repair Factory Service Center. While there will be added handling delays, you may bring your unit to one of the following locations who will then forward the unit to Elgin for repair.

Customer in Puerto Rico, please ship or carry in to location below ("Service in Puerto Rico").

Factory Servicenter Locations

CALIFORNIA

6550 Katella Avenue
Cypress, CA 90630

800 Dubuque Avenue
S. San Francisco,
CA 94080

20201 Sherman Way
Suite 102

Canoga Park, CA 91306
3878 Ruffin Road

Suite A
San Diego, CA 92123

COLORADO

1640 South Abilene
Street Suite D
Aurora, CO 80012

FLORIDA

3700 North 29th Avenue
Suite 102
Hollywood, FL 33020

GEORGIA

8655 Roswell Road
Suite 100
Atlanta, GA 30350

ILLINOIS

9060 Golf Road
Niles, IL 60714
1703 North Randall Road
Elgin, IL 60123
(Pick-up / Drop-off only)

MARYLAND

62 Mountain Road
Glen Burnie, MD 21061

MASSACHUSETTS

60 Glacier Drive
Suite G
Westwood, MA 02090

MICHIGAN

37048 Van Dyke Avenue
Sterling Heights, MI 48312

MINNESOTA

7850-12th Avenue South
Airport Business Center
Bloomington, MN 55425

OHIO

2236 Waycross Road
Civic Center Plaza
Forest Park, OH 45240

PENNSYLVANIA

2221 Cabot Blvd. West
Suite B
Langhorne, PA 19047
Charters Valley
Shopping Center
1025 Washington Pike
Bridgeville, PA 15017

TENNESSEE

3800 Ezell Road
Suite 806
Nashville, TN 37203

TEXAS

7482 Harwin Drive
Houston, TX 77036
13615 Welch Road
Suite 101
Farmers Branch,
TX 75244

WASHINGTON

20425-84th Avenue South
Kent, WA 98032

HAWAII

99-859 Iwaiwa Street
Aiea, Hawaii 96701
Phone (808)488-1996
Fax (808)486-4369

Service in Puerto Rico

Matsushita Electric of Puerto Rico, Inc. Panasonic Sales Company/ Factory Servicer:

Ave. 65 de Infantería, Km. 9.5, San Gabriel Industrial Park, Carolina, Puerto Rico 00985

Phone (787) 750-4300 Fax (787) 768-2910

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